

# IONOSPHERIC DATA IN JAPAN

FOR DECEMBER 1982

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## INTRODUCTION

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

emission (S) and radio propagation (P) obtained at the following stations under the Radio Research Laboratories, 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".

## a. Characteristics of Ionosphere

$f_x I$	Top frequency of spread $F$ trace
$f_o F_2$	Ordinary wave critical frequency
$f_o F_1$	for the $F_2$ , $F_1$ , $E$ and $E_s$ including particle
$f_o E$	$E$ layers respectively
$f_o E_s$	
$f_b E_s$	Blanketing frequency of the $E_s$ layer, e.g. the lowest ordinary wave frequency visible through $E_s$
$f_{min}$	Lowest frequency which shows vertical ionospheric reflections
$M(3000)F_2$	Maximum usable frequency factor
$M(3000)F_1$	for a path of 3000 km for transmission by $F_2$ and $F_1$ layers respectively
$h'F_2$	Minimum virtual height on the ordinary wave for the $F_2$ , whole $F$ , $E$ and $E_s$ layers respectively
$h'F$	
$h'E$	
$h'E_s$	
Types of $E_s$	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 $E_s$ .
B	Measurement influenced by, or impossible because of, absorption in the vicinity of $f_{min}$ .
C	Measurement influenced by, or impossible because of, any non-ionospheric reason.
D	Measurement influenced by, or impossible because of, the upper limit of the normal frequency range 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 perturbation of parameters—Presence of polar spur traces.

Q	Range spread present.
R	Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
S	Measurement influenced by, or impossible because of, interference or atmospheric.
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
V	Forked trace which may influence the measurement.
W	Measurement influenced or impossible because the echo lies outside the height range recorded.
X	Measurement refers to the extraordinary component.
Y	Lacuna phenomena, severe layer tilt.
Z	Third magneto-electronic component present.

## (ii) Qualifying Letters

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

A	Less than. Used only when $f_b E_s$ is deduced from $f_o E_s$ 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  $E_s$ 

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

$f$	An $E_s$ trace which shows no appreciable increase of height with frequency.
l	A flat $E_s$ trace at or below normal $E$ layer minimum virtual height or below the particle $E$ layer minimum virtual height.
c	An $E_s$ trace showing a relatively symmetrical cusp at or below $f_o E$ . (Usually a daytime type.)
h	An $E_s$ trace showing a discontinuity in height with the normal $E$ layer trace at or above $f_o E$ . The cusp is not symmetrical, the low frequency end of the $E_s$ trace lying clearly above the high frequency end of the normal $E$ trace. (Usually a daytime type.)
q	An $E_s$ trace which is diffuse and non-blanketing over a wide frequency range.
r	An $E_s$ trace showing an increase in virtual height at the high frequency end similar to group retardation.
a	An $E_s$ 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<sub>min</sub>*.

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  $f_{oEs} > f_{oE}$  (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 Hiraíso. Observation equipments are: a 5 meter parabolic reflector with a total-power receiver for 500 MHz and a 10 meter parabolic reflector with two polarimeters for 100 and 200 MHz. 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 Monthly Report for Solar Radio Emission, WDC-C2".

a. Daily Data

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 parenthesis mean that observation time does not exceed one third of the period.

b. Outstanding Occurrences

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. Measurement of H. F. Field Strength

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 Hiraíso. In order to avoid interference among the same frequency waves, the upper side-band of WWV or WWVH with the audio tone 600 Hz is picked up by the use of a narrow band pass filter with 80 Hz band width. Particulars of the transmitters and the receiver are summarized in the following table.

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

The tabulated *field strength* in dB above one microvolt per meter is the peak average of the incident upper side-band 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 are 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

The tabulated six-hourly quality figures are calculated for standard waves WWV transmitted from Fort Collins and standard waves 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 1<sub>0</sub>, 1<sub>+</sub>, 2<sub>-</sub>, 2<sub>0</sub>, 2<sub>+</sub>, 3<sub>-</sub>, 3<sub>0</sub>, 3<sub>+</sub>, 4<sub>-</sub>, 4<sub>0</sub>, 4<sub>+</sub>, 5<sub>-</sub>, 5<sub>0</sub> 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 per an 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 gamma. When they are uncertain quantitatively, /'s are replaced with them. Continuation of a geomagnetic storm is denoted by ---.

#### c. Sudden Ionospheric Disturbances

##### (i) SWF

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<sub>-</sub>, 1, 1<sub>+</sub>, 2<sub>-</sub>, 2, 2<sub>+</sub>, 3<sub>-</sub>, 3, 3<sub>+</sub>.

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

##### (ii) SPA

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 (i) SWF and (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 (kW)	Arc Distance from Inubo (km)
Rugby	52° 22' N	001° 11' W	GBR	16.0	(750) 60	9550
Jim Creek	48° 12' N	121° 55' W	NLK	18.6	(1200) 130	7620
North West Cape	21° 49' S	114° 10' E	NWC	22.3	1000	6990
Aldra	66° 25' N	013° 09' E	Ω/N	13.6	10	7820
North Dakota	46° 22' N	098° 21' W	Ω/ND	13.6	10	9140
Haiku	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

DEC. 1982

FXI (0.1 MHZ)

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

Station		WAKKANAI											Lat. 45 23.5 N		Long 141 41.2 E		Sweep 1 MHz to 20 MHz in 20sec 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 47	X 50	X 49	X 52	X 50	X 40	X 42											X 65	X 47	X 48	X 44	X 41	X 43	X 43			
2	X 44	X 44	X 43	X 45	X 45	X 47	X 44											X 57	X 51	X 47	X 41	X 32	X 34	X 35			
3	X 36	X 37	X 40	X 41	X 37	X 37	X 36											X 56	X 49	X 38	X 39	X 34	X 37	X 37			
4	X 39	X 40	X 40	X 42	X 43	X 45	X 38											X 59	X 50	X 48	X 47	X 39	X 43	X 43			
5	X 43	X 44	X 45	X 45	X 46	X 46	X 46											X 78	X 74	X 75	X 57	X 47	X 48	X 47			
6	X 50	X 55	X 50	X 52	X 52	X 51	X 48											X 62	X 57	X 50	X 51	X 47	X 52	X 50			
7	X 50	X 52	X 56	X 54	X 55	X 55	X 50											X 81	X 64	X 55	X 38	X 37	X 39	X 38			
8	X 40	X 41	X 42	X 41	X 43	X 35	X 37											X 75	X 81	X 79	X 58	X 51	X 51	X 53			
9	X 52	X 51	X 45	X 41	X 39	X 41	X 40											X 81	X 66	X 51	X 47	X 37	X 39	X 40			
10	X 39	X 41	X 43	X 47	X 45	X 40	X 39											X 87	X 63	X 48	X 43	X 53	X 56	X 58			
11	X 55	X 45	X 38	X 36	X 36	X 35	X 34											X 72	X 56	X 56	X 52	X 48	X 50	X 56			
12	X 58	X 58	X 53	X 52	X 53	X 50	X 60											X 92	X 74	X 59	X 43	X 43	X 44	X 46			
13	X 48	X 50	X 47	X 48	X 57	X 54	X 56											X 65	X 56	X 52	X 45	X 48	X 51	X 56			
14	X 57	X 60	X 60	X 53	X 55	X 57	X 58											X 80	X 63	X 57	X 44	X 37	X 40	X 42			
15	X 42	X 44	X 47	X 44	X 40	X 40	X 39											X 65	X 58	X 56	X 50	X 52	X 45	X 44			
16	X 46	X 46	X 47	X 47	X 50	X 50	X 50											X 77	X 70	X 45	X 40	X 42	X 41	X 39			
17	X 40	X 40	X 40	X 39	X 40	X 35	X 37											X 91	X 65	X 40	X 43	X 45	X 51	X 41			
18	X 44	X 51	X 50	X 57	X 48	X 37	X 33											X 70	X 64	X 60	X 54	X 55	X 61	X 58			
19	X 43	X 35	X 34	X 37	X 39	X 44	X 54											X 76	X 74	X 63	X 54	X 51	X 50	X 50			
20	X 54	X 58	X 41	X 40	X 35	X 37	X 40											X 97	X 78	X 63	X 38	X 37	X 35	X 36			
21	X 37	X 35	X 35	X 36	X 37	X 35	X 37											X 79	X 55	X 56	X 41	X 43	X 43	X 43			
22	X 40	X 39	X 39	X 38	X 38	X 42	X 44											X 72	X 56	C	C	C	C	C			
23	C	C	C	C	C	C	C											C	C	X 57	X 50	X 40	X 40	X 42			
24	X 41	X 41	X 40	X 40	X 38	X 38	X 37											X 49	X 55	X 45	X 33	X 37	X 38	X 38			
25	X 40	X 40	X 40	X 42	X 43	X 43	X 41											X 63	X 52	X 49	X 41	X 35	X 36	X 37			
26	X 38	X 38	X 40	X 39	X 39	X 33	X 34											X 62	X 60	A	X 37	X 37	X 38	X 40			
27	X 40	X 41	X 41	X 41	X 40	X 41	X 41											X 61	X 57	X 42	X 38	X 39	X 38	X 39			
28	X 41	X 43	X 42	X 39	X 39	X 38	X 40											X 67	X 60	X 50	X 43	X 44	X 54	X 46			
29	X 47	X 47	X 49	X 50	X 52	X 40	X 35											X 81	X 60	X 40	X 34	X 37	X 37	X A			
30	X 37	X 37	X 38	X 40	X 45	X 35	X 32											X 62	X 62	X 54	X 42	X 41	X 41	X 42			
31	X 43	X 44	X 40	X 41	X 41	X 42	X 39											X 63	X 59	X 43	X 38	X 40	X 39	X 39			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	30	30	30	30	30	30	30											30	30	29	30	30	30	29			
MED	X 43	X 44	X 42	X 42	X 43	X 40	X 40											X 71	X 60	X 51	X 43	X 41	X 42	X 42			
UQ	X 48	X 50	X 47	X 48	X 50	X 46	X 46											X 80	X 65	X 57	X 50	X 47	X 50	X 47			
LQ	X 40	X 40	X 40	X 40	X 39	X 37	X 37											X 62	X 56	X 47	X 39	X 37	X 38	X 39			

DEC. 1982

FXI (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1982

FOF2 (0.1 MHz)

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

Station WAKKANAI Lat. 45 23.5 N, Long 141 41.2 E Sweep 1 MHz to 20 MHz in 20sec 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	40	43	42	45	43	33	35	61	93	100	119	108	113	<sup>H</sup> 113	92	85	75	58	40	41	37	34	36	36
2	37	37	36	38	38	40	37	65	82	91	104	106	101	89	86	90	67	50	44	40	34	25	27	28
3	29	30	33	34	30	30	29	59	83	92	91	115	105	98	82	89	71	49	42	31	32	27	30	30
4	32	33	33	35	36	38	31	62	83	98	108	111	106	95	100	100	70	52	43	41	40	32	36	36
5	36	37	38	38	39	39	39	70	89	98	133	114	107	114	112	100	83	71	67	68	50	40	41	40
6	43	<sup>F</sup> 43	43	45	45	44	41	63	93	108	118	121	108	100	90	90	70	55	50	43	44	40	45	43
7	43	45	49	47	48	48	43	71	90	108	113	114	111	108	91	94	85	74	57	48	31	30	32	31
8	33	34	35	34	36	28	30	57	92	99	125	124	117	120	110	103	101	68	74	72	51	44	44	46
9	45	44	38	34	32	34	33	62	96	132	<sup>H</sup> 143	150	136	134	126	113	98	74	59	44	40	30	32	33
10	32	34	36	40	38	33	32	63	106	126	138	140	125	130	119	111	90	80	56	41	36	46	49	51
11	48	38	31	29	29	28	<sup>H</sup> 27	57	89	99	135	135	128	134	123	113	97	65	49	49	45	<sup>S</sup> 41	43	<sup>F</sup>
12	<sup>F</sup>	<sup>F</sup>	<sup>F</sup>	<sup>F</sup>	<sup>F</sup>	<sup>F</sup>	<sup>F</sup> 43	59	97	140	137	142	136	140	126	116	91	85	67	52	36	36	37	39
13	41	43	40	<sup>F</sup>	<sup>F</sup>	47	49	64	90	113	127	137	121	115	106	94	78	58	49	45	38	<sup>F</sup>	<sup>F</sup>	<sup>F</sup>
14	<sup>F</sup>	<sup>F</sup>	<sup>F</sup> 53	46	48	50	51	59	90	113	121	117	113	115	107	106	93	73	56	50	37	30	33	35
15	35	37	40	37	33	33	32	53	82	110	134	125	104	<sup>H</sup> 106	96	99	83	58	51	49	43	45	38	37
16	39	39	40	40	43	43	43	57	86	111	131	129	110	107	97	88	81	70	63	38	33	35	34	32
17	33	33	33	32	33	28	30	61	107	148	141	120	131	127	117	118	108	84	58	33	36	38	44	34
18	37	44	43	50	41	30	26	53	80	99	110	106	114	115	115	110	83	63	57	53	47	48	54	51
19	36	28	27	30	32	37	47	<sup>A</sup>	106	142	157	139	127	131	125	103	79	69	67	56	47	44	43	43
20	47	51	34	33	28	<sup>F</sup> 24	<sup>F</sup> 25	64	103	112	131	124	<sup>A</sup>	123	112	92	93	90	71	56	31	30	28	29
21	30	28	28	29	30	28	30	52	103	103	126	130	129	127	109	105	<sup>H</sup> 80	72	48	49	34	36	36	36
22	33	32	32	31	31	<sup>F</sup>	<sup>F</sup>	46	96	108	122	125	<sup>H</sup> 128	128	123	122	92	65	49	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>
23	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	110	129	120	100	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	50	43	33	33	35
24	34	34	33	33	31	31	30	53	<sup>H</sup> 85	100	136	153	133	113	104	101	71	<sup>H</sup> 42	48	<sup>H</sup> 38	26	30	31	31
25	33	33	33	35	36	36	34	56	92	<sup>H</sup> 105	106	122	100	114	112	84	75	56	45	42	34	28	29	30
26	31	31	33	32	32	26	27	54	84	88	122	121	110	89	93	94	63	55	53	<sup>A</sup>	30	30	31	33
27	33	34	34	34	33	34	34	50	86	98	103	111	101	104	103	84	69	54	50	35	31	32	31	32
28	34	36	35	32	32	31	33	52	80	105	100	106	105	93	96	101	77	60	53	43	36	37	<sup>F</sup> 42	39
29	40	40	42	43	45	33	28	53	90	110	128	113	111	103	90	90	74	74	53	33	27	30	30	<sup>A</sup>
30	30	30	31	33	38	<sup>H</sup> 28	25	47	83	108	105	107	101	101	98	92	<sup>A</sup>	55	55	47	35	34	34	35
31	36	37	33	34	34	35	32	50	94	107	115	112	95	110	97	74	75	56	52	36	31	33	32	32
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	29	28	28	28	29	29	30	31	31	31	30	30	30	30	29	30	30	29	30	29	29	27
MED	36	36	35	34	35	33	32	57	90	108	125	121	111	114	105	100	80	64	53	44	36	34	34	35
UQ	40	42	40	40	40	38	39	62	96	112	134	130	127	127	115	106	91	73	58	50	43	40	42	39
LQ	33	33	33	32	32	29	30	53	84	99	112	112	105	103	96	90	74	55	49	40	32	30	31	32

DEC. 1982

FOF2 (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

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

DEC. 1982

FOF1 (0.01 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOE (0.01 MHZ)

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

Station WAKKANAI Lat. 45 23.5 N, Long 141 41.2 E Sweep 1 MHz to 20 MHz in 20sec 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	290	305	A	300	295	265	A	S							
2								S	225	285	305	315	310	300	280	A	A							
3								S	235	A	A	310	310	300	275	220	A							
4								A	230	285	305	310	310	300	280	A	A							
5								180	225	285	300	305	315	300	260	A	A							
6								S	230	A	300	310	320	305	275	230	A							
7								S	225	290	A	A	A	310	285	225	S							
8								A	245	B	330	A	320	310	280	225	A							
9								S	A	A	300	300	305	295	290	240	A							
10								S	A	A	320	315	340	315	290	260	A							
11								A	235	A	310	A	A	310	300	A	A							
12								A	240	275	300	315	A	280	245	A	A							
13								A	A	A	300	315	310	310	A	A	A							
14								A	B	A	300	A	A	A	A	A	A							
15								135	225	275	295	330	320	300	A	A	A							
16								A	A	280	310	335	A	A	A	A	A							
17								A	235	275	295	330	315	305	280	A	A							
18								A	225	A	A	A	300	A	270	220	A							
19								A	210	260	275	A	A	300	260	A	S							
20								A	A	275	290	310	A	A	A	A	A							
21								A	205	245	270	295	285	270	A	A	A							
22								A	A	250	270	280	300	A	260	A	A							
23								C	C	A	285	275	275	C	C	C	C							
24								S	A	A	A	A	B	B	B	B	A							
25								E	215	A	A	290	300	290	265	A	S							
26								E	210	260	A	305	310	290	A	A	A							
27								A	200	250	290	305	310	280	265	A	A							
28								E	225	255	280	280	305	290	250	A	A							
29								A	200	B	A	300	300	285	270	A	A							
30								A	A	A	A	B	A	A	270	200	S							
31								A	205	A	A	A	A	290	265	205	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								5	20	16	22	21	21	23	22	9								
MED								E	225	275	300	310	310	300	270	225								
UQ								135	232	285	305	315	315	305	280	230								
LQ								E	210	258	290	300	300	290	265	220								

DEC. 1982

FOE (0.01 MHZ)



# IONOSPHERIC DATA

DEC. 1982

FOES (0.1 MHz)

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

Station	WAKKANAI																									
	Lat. 45 23.5 N							Long 141 41.2 E							Sweep 1 MHz to 20 MHz in 20sec 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	E	E	E	E	E	E	27	32	G	G	40	G	G	21	50	43	32	E S 14	E S 15	30	40	E S 15	E	30	
2	22	27	30		E	E	E S 17	20	G	G	G	64	G	G	G	31	35	34	E S 15	E S 15	E S 15	E S 15	E	E S 12		
3	E	E	E	E	90	E	E S 16	E S 18	G	41	43	44	31	36	G	G	25	E S 14	E	20	24	31	26	E		
4	E	E	24	27	30	E	E	27	G	G	25	33	40	36	35	G	21	25	30	30	29	E S 15	E S 15	E	E S 16	28
5	E	E	26	E	E	21	E S 16	G	G	G	37	36	G	G	G	31	33	35	23	E	E	E S 15	E	E	E	
6	E	30	23	30	E	E	E S 16	G	40	G	G	G	G	G	G	G	63	27	E S 15	E S 15	30	28	30	31		
7	32	50	E	E S 16	E	E	E	20	G	G	34	43	37	G	G	G	E S 15	E S 15	E	E	E S 15	E	E	E S 15		
8	E S 15	E S 15	E	E	E	E	E	21	G	E B 40	G	43	G	G	G	30	33	32	32	E S 16	E	E	E	E		
9	29	E	E	E	36	36	26	31	30	43	36	G	G	G	42	G	25	18	34	28	E S 15	E	E S 15	20		
10	33	24	E	E	E	E	E S 11	23	34	34	37	43	G	34	32	G	40	14	24	E S 12	14	13	E S 12	E S 13		
11	25	30	26	E	E	E	E	24	G	58	36	45	90	G	G	73	J A 110	30	33	95	38	82	55	26		
12	E	28	E	15	25	E	30	26	26	35	42	39	57	34	27	25	17	E S 14	E	30	51	34	E S 15	E S 15		
13	22	26	25	35	28	25	50	38	35	39	32	35	36	34	30	50	35	31	44	35	E S 15	E S 15	E S 14	E S 15		
14	E	E	E	E	35	36	60	35	E B 22	30	G	52	48	40	28	25	15	15	40	E S 14	E S 15	E S 12	E S 12	50		
15	50	E	E	E	26	E S 15	E S 15	G	26	G	G	G	G	G	32	63	40	60	70	30	E S 14	22	40	40		
16	35	35	30	36	27	E	E	34	25	34	G	G	38	51	48	23	18	71	43	34	33	24	31	26		
17	28	E	E S 13	24	E	E	E S 15	25	G	G	34	36	G	G	G	32	22	30	E	E	E S 16	E S 13	E	E S 12		
18	E	E	E	E	30	30	24	32	36	78	43	60	37	34	32	27	42	40	J A 82	27	26	58	26	31		
19	33	16	16	18	17	19	22	J A 135	70	40	90	60	40	40	G	24	21	40	34	32	32	37	20	60		
20	35	34	E	14	29	E	E S 13	16	29	45	J A 94	77	J A 155	75	J A 133	71	52	63	38	40	34	35	31	25		
21	27	74	E	32	25	68	E	18	45	58	61	72	62	36	30	27	40	38	34	18	31	E S 13	E S 15	E S 15		
22	E	E	26	E S 15	E	E	14	30	26	35	60	63	60	100	63	90	31	38	56	C	C	C	C	C		
23	C	C	C	C	C	C	C	C	C	34	34	64	62	C	C	C	C	C	C	C	38	32	36	27	E S 17	
24	E S 15	33	E S 15	E S 15	E S 16	E S 18	E S 16	E S 16	24	29	51	61	E B 36	E B 32	E B 30	E B 27	15	36	E	E S 16	E	E S 15	E S 15	E		
25	E	24	E	E	E	31	E	15	G	28	34	33	G	G	G	25	30	36	E S 12	15	36	50	30	E	E	
26	E	33	14	E	14	E	E	16	24	G	50	G	34	41	56	40	45	27	58	80	38	E S 14	E S 15	24		
27	E	27	E	E	30	28	E	25	25	G	G	36	G	G	G	23	15	59	34	E	90	38	38	31		
28	E	28	30	E	40	40	E	14	G	61	70	48	G	39	53	30	25	24	E S 13	35	51	24	37	40		
29	37	30	E	E	25	E	30	28	G	E B 28	33	G	G	G	G	24	28	36	15	14	31	E S 13	41	57		
30	60	28	28	26	35	30	30	30	25	34	37	62	50	35	G	30	101	40	27	24	13	15	E	E		
31	E	30	22	E	E	E	E	34	G	33	80	70	40	35	G	18	30	E	E	E	62	28	35	27		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	30	30	30	30	30	30	30	30	30	31	31	31	31	30	30	30	30	30	30	30	30	30	30	30		
MED	15	26	E E 13	E	21	E	E E 14	24	24	34	36	43	36	34	24	27	32	30	28	22	28	15	E E 15	22		
UQ	32	30	25	18	30	28	22	30	29	40	46	60	44	36	32	32	40	38	38	34	38	31	31	31		
LQ	E	E	E	E	E	E	E	16	G	E E 25	E G 32	36	G	G	G	23	22	15	15	E E 14	E S 15	E S 13	E	E S 12		

DEC. 1982

FOES (0.1 MHz)

### IONOSPHERIC DATA

DEC. 1982

FBES (0.1 MHz)

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

Station WAKKANAI Lat. 45 23.5 N Long 141 41.2 E Sweep 1 MHz to 20 MHz in 20sec 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	E	E	E	E	E	E	18	26	G	G	31	G	G	20	20	21	G	E S 14	E S 15	E	E	E S 15	E	E	
2	E	E	E	E	E	E	E S 17	G	G	G	G	26	G	G	G	23	25	E	E S 15	E S 15	E S 15	E S 15	E	E S 12	E	E S
3	E	E	E	E	E	E	E S 16	E S 18	G	30	31	25	24	G	G	G	19	E S 14	E	E	E	E	E	E	E	
4	E	E	E	E	E	E	E	16	G	G	22	25	G	G	G	20	23	18	E	E	E S 15	E S 15	E	E S 16	E	
5	E	E	E	E	E	E	E S 16	G	G	G	G	G	G	G	G	24	30	E	E	E	E	E S 15	E	E	E	
6	E	E	E	E	E	E	E S 16	G	30	G	G	G	G	G	G	G	16	E	E S 15	E S 15	E	E	E	E	E	
7	E	E	E	E	E S 16	E	E	G	G	G	32	32	32	G	G	G	E S 15	E S 15	E	E	E S 15	E	E	E S 15	E	
8	E S 15	E S 15	E	E	E	E	E	18	G	E B 40	G	35	G	G	G	19	17	E	E	E S 16	E	E	E	E	E	
9	E	E	E	E	21	E	E	26	26	27	G	G	G	G	G	G	17	E	E	E	E S 15	E	E S 15	E	E	
10	E	E	E	E	E	E	E S 11	G	27	31	G	G	G	G	G	G	20	E	E	E S 12	E	E	E S 12	E S 13	E	
11	E	E	E	E	E	E	E	G	G	42	27	38	33	G	G	53	43	E	E	E	E	E	E	21	E	
12	E	E	E	E	E	E	E	G	G	G	40	37	30	G	G	24	15	E S 14	E	E	E	E	E S 15	E S 15	E	
13	E	E	E	E	E	E	E	17	25	28	G	G	G	G	28	24	20	E	30	E	E S 15	E S 15	E S 14	E S 15	E	
14	E	E	E	E	E	22	37	27	E B 22	28	G	34	33	33	27	24	15	E	E	E S 14	E S 15	E S 12	E S 12	E	E	
15	E	E	E	E	E	E S 15	E S 15	G	G	G	G	G	G	G	27	28	17	50	30	E	E S 14	E	28	E	E	
16	E	23	E	E	E	E	E	18	25	26	G	G	33	31	26	22	G	40	E	20	E	E	E	E	E	
17	E	E	E S 13	E	E	E	E S 15	14	G	G	G	G	G	G	G	G	15	E	E	E	E S 16	E S 13	E	E S 12	E	
18	E	E	E	E	E	22	E	17	G	28	34	32	G	32	G	G	17	30	E	E	30	E	E	E	E	
19	24	E	E	E	E	E	E	A A 135	67	40	43	33	32	G	G	24	18	E	E	E	E	E	E	E	E	
20	E	E	E	E	E	E	E S 13	16	25	40	50	70	A A 155	60	50	24	30	35	23	26	E	E	E	E	E	
21	E	E	E	E	E	E	E	G	31	39	46	47	50	36	28	23	17	E	E	E	E	E S 13	E S 15	E S 15	E	
22	E	E	E	E S 15	E	E	E	14	23	G	40	48	32	32	40	24	17	E	E	C	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	G	G	45	45	C	C	C	C	C	C	C	C	E	E	E	E S 17	
24	E S 15	E	E S 15	E S 15	E S 16	E S 18	E S 16	E S 16	24	27	43	50	E B 36	E B 32	E B 30	E B 27	15	E	E	E S 16	E	E S 15	E S 15	E	E	
25	E	E	E	E	E	E	E	G	G	27	30	G	G	G	G	23	23	18	E S 12	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	G	G	G	32	G	G	G	42	26	20	E	E	A A 80	20	E S 14	E S 15	E	E	
27	E	E	E	E	E	E	E	14	18	G	G	G	G	G	G	23	15	E	E	E	E	E	E	E	E	
28	E	E	E	E	E	E	E	G	G	32	40	G	G	G	47	26	17	E	E S 13	E	E	E	E	E	E	
29	E	E	E	E	E	E	E	15	G	E B 28	29	G	G	G	G	24	16	E	E	E	E	E S 13	E	A A 57	E	
30	E	E	E	E	E	E	E	15	23	27	29	41	32	30	G	G	A A 101	24	E	E	E	E	E	E	E	
31	E	E	E	E	E	E	E	15	G	25	34	31	31	25	G	G	16	E	E	E	24	E	E	E	E	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	30	30	30	30	30	30	30	30	30	31	31	31	31	30	30	30	30	30	30	30	30	30	30	30	30	
MED	E	E	E	E	E	E	E	14	G	26	27	26	G	G	G	23	17	E	E	E	E	E	E	E	E	
UQ	E	E	E	E	E	E	E S 13	17	25	30	34	36	32	U	28	27	24	20	E	E	E	E	E S 15	E S 13	E S 15	E S 12
LQ	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	G	15	E	E	E	E	E	E	E	E	

DEC. 1982

FBES (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

F-MIN (0.1 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI																							
Lat.	45° 23.5' N																							
Long	141° 41.2' E																							
Sweep	1 MHz to 20 MHz in 20sec 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	E	E	E	E	E	E	10	11	11	17	16	16	11	11	10	E <sub>15</sub>	E <sub>14</sub>	E <sub>15</sub>	E	E	E <sub>15</sub>	E	E
2	E	E	E	E	E	E	E <sub>17</sub>	E <sub>14</sub>	13	15	18	17	17	17	18	10	E	E	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>12</sub>
3	E	E	E	E	E	E	E <sub>16</sub>	E <sub>18</sub>	16	17	16	17	17	17	18	17	10	E <sub>14</sub>	E	E	E	E	E	E
4	E	E	E	E	E	E	E	11	11	12	11	18	20	20	17	12	E	E	E	E <sub>15</sub>	E <sub>15</sub>	E	E <sub>16</sub>	E
5	E	E	E	E	E	E	E <sub>16</sub>	E	19	24	22	24	20	19	18	18	10	E	E	E	E	E <sub>15</sub>	E	E
6	E	E	E	E	E	E	E <sub>16</sub>	E <sub>16</sub>	16	16	17	19	18	17	17	18	10	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E	E	E <sub>15</sub>	E
7	E	E	E	E	E <sub>16</sub>	E	E <sub>12</sub>	E	17	17	17	17	18	18	18	17	E <sub>15</sub>	E <sub>15</sub>	E	E	E <sub>15</sub>	E	E	E <sub>15</sub>
8	E <sub>15</sub>	E <sub>15</sub>	E	E	E	E	E	E	16	40	26	20	20	18	18	11	10	E	E	E <sub>16</sub>	E	E	E	E
9	E <sub>15</sub>	E	E	E	E	E	E <sub>15</sub>	E <sub>15</sub>	17	19	20	20	21	19	19	17	E	E	E	E <sub>15</sub>	E <sub>15</sub>	E	E <sub>15</sub>	E
10	E	E	E	E	E	E	E <sub>11</sub>	E <sub>15</sub>	17	18	23	24	29	27	27	24	10	E <sub>15</sub>	E	E <sub>12</sub>	E	E	E <sub>12</sub>	E
11	E	E	E	E	E	E	E	E	16	17	18	20	22	18	26	16	10	E	E <sub>15</sub>	E	E <sub>16</sub>	E	E	E
12	E	E	E	E	E	E	E <sub>13</sub>	E	15	16	17	17	11	16	17	15	12	E <sub>14</sub>	E	E	E	E	E <sub>15</sub>	E <sub>15</sub>
13	E	E	E	E	E	E	E	E	13	16	17	19	21	20	19	17	E	E	E	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>14</sub>	E <sub>15</sub>
14	E	E	E	E	E	E	E	E	22	22	21	21	21	22	12	18	E	E	E <sub>15</sub>	E <sub>14</sub>	E <sub>15</sub>	E <sub>12</sub>	E <sub>12</sub>	E
15	E	E	E	E	E	E <sub>15</sub>	E <sub>15</sub>	11	16	18	21	21	23	18	17	12	E	E	E <sub>15</sub>	E <sub>14</sub>	E <sub>14</sub>	E	E <sub>13</sub>	E <sub>15</sub>
16	E	E	E	E	E	E	E	E	13	15	16	17	17	16	15	16	11	E	E	E	E	E <sub>15</sub>	E	E
17	E	E	E <sub>13</sub>	E	E	E	E <sub>15</sub>	E	12	17	17	23	19	17	17	17	E	E	E	E	E <sub>16</sub>	E <sub>13</sub>	E	E <sub>12</sub>
18	E	E	E	E	E	E	E	E	18	19	20	20	17	23	23	19	10	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E	E	17	20	22	21	22	20	18	17	E <sub>12</sub>	E	E	E	E	E	E <sub>15</sub>	E
20	E <sub>15</sub>	E	E	E	E	E	E <sub>13</sub>	E	18	20	23	22	24	23	20	17	11	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	E	15	16	20	22	22	21	20	18	12	E	E	E	E	E <sub>13</sub>	E <sub>15</sub>	E <sub>15</sub>
22	E	E	E	E <sub>15</sub>	E	E	E	E	17	17	19	20	22	18	17	17	E	E	E	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	20	22	22	20	C	C	C	C	C	C	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>17</sub>
24	E <sub>15</sub>	E	E <sub>15</sub>	E <sub>15</sub>	E <sub>16</sub>	E <sub>18</sub>	E <sub>16</sub>	E <sub>16</sub>	18	22	25	28	36	32	30	27	E	E	E	E <sub>16</sub>	E	E <sub>15</sub>	E <sub>15</sub>	E
25	E	E	E	E	E	E	E	E	16	17	17	18	20	20	18	17	E <sub>15</sub>	E <sub>12</sub>	E	E <sub>14</sub>	E	E <sub>15</sub>	E	E
26	E	E	E	E	E	E	E	E	18	20	19	23	25	21	20	17	E	E	E	E	E <sub>15</sub>	E <sub>14</sub>	E <sub>15</sub>	E
27	E	E	E	E	E	E	E	E	15	18	22	23	25	20	18	17	E	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	18	20	23	25	25	25	22	18	E	E	E <sub>13</sub>	E	E <sub>15</sub>	E	E	E
29	E	E	E	E	E	E	E	E	16	28	23	24	23	25	22	18	E	E	E	E	E <sub>15</sub>	E <sub>13</sub>	E	E
30	E	E	E	E	E	E	E	E	15	17	20	31	21	17	17	16	E <sub>13</sub>	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	11	14	15	12	13	16	17	13	E	E	E	E	E	E	E	E
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	31	31	31	31	30	30	30	30	30	30	30	30	30	30	30
MED	E	E	E	E	E	E	E	E	16	17	20	20	21	19	18	17	E <sub>10</sub>	E	E	E	E	E	E	E
UQ	E	E	E	E	E	E	E <sub>13</sub>	E <sub>11</sub>	17	20	22	23	22	21	20	18	10	E	E	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>15</sub>	E <sub>12</sub>
LQ	E	E	E	E	E	E	E	E	15	16	17	18	18	17	17	16	E	E	E	E	E	E	E	E

DEC. 1982

F-MIN (0.1 MHZ)

### IONOSPHERIC DATA

DEC. 1982

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI																							Lat. 45° 23' 5" N	Long 141° 41' 2" E	Sweep 1	MHz to 20 MHz in 20sec 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	255	275	290	305	280	285	320	320	320	335	325	325	325 <sup>H</sup>	320	345	320	330	295	300	295	265	275	275																									
2	265	270	280	275	290	295	295	325	360	335	345	320	340	325	335	330	340	300	320	310	330	250	260	260																									
3	250	265	285	300	280	270	275	320	350	345	330	330	325	335	325	325	310	305	310	290	310	280	265	270																									
4	250	255	265	270	295	300	305	315	335	325	315	315	340	305	320	330	305	305	290	285	300	280	255	290																									
5	270	270	265	265	255	295	280	330	330	310	325	300	300	300	305	310	305	310	295	315	425	290	290	275																									
6	275	280 <sup>F</sup>	280	290	290	295	290	315	345	325	320	315	325	330	325	325	315	310	280	290	295	275	285	270																									
7	295	280	255	275	270	280	300	335	335	315	335	325	325	315	295	310	330	295	305	310	285	240	235	240																									
8	235	240	255	235	260	240	265	295	320	280	290	310	305	310	310	300	320	295	290	335	300	270	245	265																									
9	265	250	235	245	250	240	225	290	310	325	305 <sup>H</sup>	320	310	310	305	310	305	320	300	305	305	265	265	245																									
10	240	245	265	295	305	285	280	305	325	320	295	315	310	310	310	310	295	320	265	250	220	240	240	255																									
11	265	240	230	215	245	300	280 <sup>H</sup>	330	230	295	305	315	290	305	300	325	310	315	285	290	280	265 <sup>S</sup>	265	F																									
12	F	F	F	F	F	F	F	310	285	305	295	310	310	305	300	310	310	305	310	310	310	260	250	255																									
13	265	270	285	F	F	275	300	310	335	330	305	310	310	330	285	325	320	290	320	315	310	F	F	F																									
14	F	F	F	270	255	250	320	305	330	310	315	320	315	310	305	315	305	320	305	310	325	280	270	260																									
15	260	255	275	280	300	290	285	305	320	310	315	310	310	315 <sup>H</sup>	310	310	320	295	280	280	280	295	280	285																									
16	270	270	265	255	260	280	310	320	305	330	320	300	310	300	305	320	305	275	320	305	260	270	280	240																									
17	250	260	250	240	260	250	245	280	295	290	305	305	300	305	300	310	300	310	310	280	240	240	260	285																									
18	230	260	250	275	270	310	270	275	320	305	310	330	300	330	300	330	305	295	275	260	240	250	265	285																									
19	315	240	230	250	240	290	295	A	325	310	310	325	310	310	320	330	310	300	300	290	290	260	250	235																									
20	250	330	305	300	270	250 <sup>F</sup>	270 <sup>F</sup>	305	330	325	325	320	A	315	305	325	300	310	305	330	280	240	240	235																									
21	235	260	250	240	245	245	280	285	330	305	310	320	325	320	320	330	305 <sup>H</sup>	320	300	325	250	260	240	255																									
22	240	250	260	250	260	F	F	270	345	315	325	280 <sup>H</sup>	320	330	300	310	310	300	280	C	C	C	C	C																									
23	C	C	C	C	C	C	C	C	C	C	320	325	330	305	C	C	C	C	C	C	300	310	305	265	250																								
24	250	265	255	240	230	245	245	275	290 <sup>H</sup>	300	315	305	325	300	305	315	330	310 <sup>H</sup>	310 <sup>H</sup>	310 <sup>H</sup>	270	285	270	280																									
25	260	265	260	260	260	300	295	320	330	285 <sup>H</sup>	325	340	330	330	340	340	340	330	300	320	310	280	270	270																									
26	250	250	265	285	275	255	300	320	340	325	350	335	340	340	335	350	320	305	315	A	305	265	255	260																									
27	245	260	260	280	285	280	305	315	350	330	320	330	335	330	340	335	320	310	310	300	265	260	245	250																									
28	260	285	290	290	260	255	280	315	340	340	345	320	330	320	300	340	320	310	310	325	280	270	270 <sup>F</sup>	265																									
29	265	250	270	270	330	290	265	290	330	330	320	330	305	330	330	300	310	320	350	310	265	280	275	A																									
30	265	250	250	270	330	300 <sup>H</sup>	300	300	330	350	320	325	330	315	315	340	A	300	315	340	300	280	290	280																									
31	280	300	270	265	270	310	310	320	340	335	340	315	320	320	335	335	330	320	330	335	280	280	285	280																									
CNT	28	28	29	28	28	28	29	29	30	31	31	31	30	30	30	30	29	30	30	29	30	29	29	27																									
MED	260	260	265	270	270	280	285	310	330	320	320	320	318	315	310	325	310	310	305	310	292	270	265	265																									
UQ	265	270	275	282	290	295	300	320	340	330	325	325	325	330	325	330	320	320	310	315	310	280	275	278																									
LQ	250	250	255	250	258	252	275	290	320	308	310	310	305	310	305	310	305	300	290	290	270	260	250	252																									

DEC. 1982

M(3000)F2 (0.01)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1982

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI																							
Lat.	45° 23.5' N							Long	141° 41.2' E							Sweep 1 MHz to 20 MHz in 20sec 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																								
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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																								
MED																								
UQ																								
LQ																								

DEC. 1982

M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9 h)

Station WAKKANAI Lat. 45° 23.5' N Long 141° 41.2' E Sweep 1 MHz to 20 MHz in 20 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																								
2																								
3																								
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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																								
MED																								
UQ																								
LQ																								

DEC. 1982

H<sup>o</sup>F<sub>2</sub> (KM)

# IONOSPHERIC DATA

DEC. 1982

H \* F (KM)

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

Station Hour Day	WAKKANAI										Lat. 45 23.5 N		Long 141 41.2 E		Sweep 1 MHz to 20 MHz in 20sec 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	350	310	280	260	225	210	270	225	215	205	225	220	220	215 <sup>H</sup>	210	220	205	200	255	250	240	285	305	305	
2	305	310	300	300	265	240	250	230	205	220	225	215	225	215	220	220	205	220	225	245	225	415	335	325	
3	320	320	280	255	270	250	275	225	215	220	205	245	230	220	215	225	210	210	225	250	250	300	345	325	
4	350	325	350	300	295	255	225	205	220	220	220	225	225	215	240	215	205	220	255	255	250	265	340	290	
5	280	290	330	325	315	255	250	230	215	220 <sup>H</sup>	250	220	225	235	220	215	215	220	250	230	205	245	250	260	
6	285	305	300	270	250	245	240	220	220	220	225	220	225	220	215	225	200	200	235	230	255	250	275	270	
7	285	275	285	270	280	245	215	220	215	220	220	220	230	225	210	215	210	220	225	220	250	350	375	425	
8	400	400	350	350	340	385	300	270	220	250 <sup>B</sup>	220	225	225	230	225	225	220	200	270	220	215	315	295	320	
9	325	340	355	340	420	305	360	245	225	225	220 <sup>H</sup>	230	225	230	230	225	220	200	225	230	220	260	350	360	
10	380	340	290	245	225	205	270	240	220	215	220	210	220	230	240	220	220	220	230	320	420	325	300	285	
11	200	325	425	415	375	235	200 <sup>H</sup>	215	240	A	235	250 <sup>A</sup>	235	240	225	A	A	210	285	265	270	275	350	285	
12	300	310	370	350	350	270	240	225	225	225	230	225	225	230	225	215	205	220	210	225	230	300	320	320	
13	275	290	250	300	300	260	245	235	205	220	220	220	220	220	215	210	200	200	250 <sup>A</sup>	240	240	275	300	345	
14	325	300	255	260	320	300	A	220	215	225	220	225	220	235	220	225	220	200	230	220	235	250	300	280	
15	300	300	270	250	250	270	250	230	230	225	225	215	220	220 <sup>H</sup>	215	215	210	A	300 <sup>A</sup>	260	250	265	A	280	
16	305	320	320	330	305	255	255	215	210	225	230	215	210	220	220	215	225	A	220	250	300	295	300	350	
17	340	330	330	295	300	285	290	275	240	240	220	205	225	225	225	225	215	220	220	255	350	370	305	275	
18	400	310	335	250	330	290	330	265	250	240	225	220	225	220	220	205	200	215	300 <sup>A</sup>	295	350	375 <sup>A</sup>	275	215	
19	250	405	425	370	340	300	260	A	A	230 <sup>A</sup>	225	215	220	225	220	210	200	235	245	225	260	350	375	380	
20	320	220	200	270	295	355	325	255	215	220	A	A	A	A	A	215	250	A	250	215	250	400	450	405	
21	370	300	305	375	375	335	270	250	235	210	240 <sup>A</sup>	A	A	A	225	215	210	185 <sup>H</sup>	225	235	225	300	320	350	320
22	370	340	345	280	305	305	235	280	220	215	225	A	A	245	230	225	220	200	205	255	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	C	225	215	220	220	C	C	C	C	C	C	240	245	260	340	345
24	350	360	345	360	400	380	340	240	210	225	245	A	A	225	205	215	220	200	205 <sup>H</sup>	250	220	260	285	300	285
25	320	315	305	325	305	250	265	250	225	205	215	220	215	215	220	210	210	205	250	230	245	275	295	300	
26	340	350	320	275	265	200	275	250	220	200	230	235	220	210	A	215	190	225	250	A	280	310	330	305	
27	340	320	300	265	280	275	215	235	215	225	215	225	215	225	225	210	205	210	215	250	270	335	380	355	
28	335	290	255	255	300	320	270	220	215	220	240	230	225	215	A	220	210	205	235	220	270	300	305	300	
29	315	350	300	270	220	195	300	250	225	220	230	220	225	225	220	220	200	230	200	260	295	300	295	A	
30	320	365	350	310	250	210 <sup>H</sup>	265	240	215	215	215	215	225	220	225	215	A	245	235	220	270	260	260	270	
31	270	270	290	300	300	250	240	220	225	230	225	215	215	230	215	205	215	215	220	215	A	300	270	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	30	30	30	30	30	30	29	29	29	30	30	27	29	29	27	29	28	27	30	29	29	30	29	29	
MED	320	318	305	298	300	258	265	235	220	220	225	220	225	225	220	215	208	215	235	230	250	300	305	305	
UQ	350	340	345	330	330	300	275	250	225	225	230	225	225	230	225	220	215	220	250	250	270	325	345	345	
LQ	300	300	285	265	265	245	240	220	215	220	220	215	220	220	215	215	200	205	225	220	240	265	295	285	

DEC. 1982

H \* F (KM)

### IONOSPHERIC DATA

DEC. 1982      H'E (KM)

135° E Mean Time (G.M.T. + 9 h)

Station **WAKKANAI**    Lat. 45° 23.5' N, Long 141° 41.2' E    Sweep 1 MHz to 20 MHz in 20sec 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	110	105	A	105	110	115	A	S								
2								S	115	115	110	105	120	115	115	A	A								
3								S	110	A	A	120	115	110	115	120	A								
4								A	110	120	115	105	115	120	120	A	A								
5								170	125	130	120	120	110	110	115	A	A								
6								S	120	A	110	110	110	115	115	130	A								
7								S	130	115	A	110	A	105	115	120	S								
8								A	115	B	115	A	105	110	115	135	A								
9								S	A	A	120	115	115	115	115	120	A								
10								S	125	120	120	120	125	125	B	135	A								
11								A	125	A	135	A	A	115	130	115	A								
12								A	125	120	115	115	A	110	115	A	A								
13								A	A	A	115	115	120	120	A	A	A								
14								A	B	A	115	A	A	A	A	A	A								
15								165	125	115	115	115	120	110	A	A	A								
16								A	A	A	115	115	A	A	A	A	A								
17								A	115	115	115	120	115	115	115	A	A								
18								A	130	A	115	115	120	120	125	135	A								
19								A	B	135	125	120	120	120	120	A	S								
20								A	A	120	120	120	120	120	A	A	A								
21								A	130	120	120	115	120	120	120	120	A								
22								A	120	120	115	110	115	A	120	A	A								
23								C	C	A	125	120	120	C	C	C	C								
24								S	A	A	A	A	B	B	B	B	A								
25								E	120	115	A	120	115	115	120	A	S								
26								E	150	130	A	120	125	130	A	A	A								
27								A	A	120	125	125	125	120	115	130	A								
28								E	140	125	125	120	120	125	125	A	A								
29								A	140	B	A	120	125	125	130	A	A								
30								A	A	A	A	B	A	A	115	120	S								
31								A	120	A	A	A	A	125	115	120	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	22	17	23	24	23	25	23	12									
MED								168	125	120	115	118	120	115	115	120									
UQ									130	120	120	120	120	120	120	132									
LQ									120	115	115	115	115	110	115	120									

DEC. 1982      H'E (KM)



# IONOSPHERIC DATA

DEC. 1982

H<sup>°</sup>ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		WAKKANAI																							
		Lat. 45 23.5 N											Long 141 41.2 E												
		Sweep 1 MHz to 20 MHz in 20sec 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	E	E	E	E	E	E	E	115	110	G	G	105	G	100	100	100	100	S	S	110	105	S	E	120
2	100	100	100	E	E	E	S	160	G	G	G	110	100	100	G	100	100	95	S	S	S	S	E	S	
3	E	E	E	E	115	E	S	S	G	105	105	100	100	135	G	G	95	S	E	135	130	115	125	E	
4	E	E	100	100	100	E	E	110	G	100	100	135	125	120	100	100	100	95	S	S	E	S	115		
5	E	E	100	E	E	105	S	G	G	G	150	130	G	G	G	100	100	100	100	E	E	S	E	E	
6	E	100	105	100	E	E	E	S	G	110	G	G	G	G	G	G	100	100	S	S	115	110	110	100	
7	100	110	E	E	S	E	E	150	G	G	110	115	110	G	G	G	S	S	E	E	S	E	E	S	
8	S	S	E	E	E	E	E	120	G	B	G	110	G	G	G	105	100	100	105	S	E	E	E	E	
9	110	E	E	E	115	115	130	120	110	110	120	G	G	G	115	G	110	110	100	105	S	E	S	115	
10	105	110	E	E	E	E	S	170	135	120	125	120	G	125	120	G	100	105	105	S	100	100	S	S	
11	100	100	105	E	E	E	E	165	G	110	110	105	110	G	G	115	105	120	115	125	110	110	105	105	
12	E	105	E	110	110	E	100	115	135	125	120	115	100	110	110	115	105	S	E	120	100	100	S	S	
13	110	110	110	105	105	110	105	100	105	100	100	120	120	120	115	120	100	100	100	105	S	S	S	S	
14	E	E	E	E	105	105	105	105	B	105	G	105	105	105	105	105	100	100	100	S	S	S	S	110	
15	100	E	E	E	100	S	S	G	150	G	G	G	G	G	100	95	95	95	105	110	S	115	105	105	
16	105	100	100	100	100	E	E	110	110	155	G	G	105	100	100	105	150	105	105	100	105	100	120	120	
17	110	E	S	125	E	E	S	155	G	G	120	130	G	G	G	120	100	120	E	E	S	S	E	S	
18	E	E	E	E	105	135	140	120	130	110	115	115	120	120	125	135	100	115	110	105	110	105	110	120	
19	115	165	160	150	160	170	160	120	115	120	120	120	120	120	G	120	120	110	105	110	110	115	135	115	
20	115	110	E	135	130	E	S	110	125	115	115	115	110	110	105	110	100	105	100	100	100	100	100	100	
21	120	110	E	105	105	110	E	145	120	120	120	115	115	115	115	120	105	105	105	110	110	S	S	S	
22	E	E	120	S	E	E	155	115	135	120	120	115	120	120	115	130	110	105	105	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	150	130	110	115	C	C	C	C	C	C	100	100	105	105	S	
24	S	105	S	S	S	S	S	S	120	115	105	105	B	B	B	B	100	115	E	S	E	S	S	E	
25	E	100	E	E	E	115	E	125	G	120	110	120	G	G	100	105	105	S	100	115	110	120	E	E	
26	E	105	110	E	105	E	E	150	150	G	100	G	125	120	115	105	100	110	100	100	105	S	S	105	
27	E	100	E	E	100	110	E	110	110	G	G	120	G	G	G	130	105	110	110	E	105	105	100	100	
28	E	105	105	E	100	110	E	165	G	125	120	120	G	120	115	110	110	110	S	115	110	120	115	115	
29	115	105	E	E	110	E	100	110	G	B	115	G	G	G	G	100	105	100	100	100	120	S	105	105	
30	105	115	105	105	105	100	100	100	115	115	110	110	105	110	G	120	110	110	110	110	105	105	E	E	
31	E	105	105	E	E	E	E	100	G	105	100	100	100	100	G	100	100	E	E	E	105	105	100	100	
	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	14	19	13	10	17	11	9	25	16	21	23	25	18	18	16	24	29	24	20	18	19	16	13	16	
MED	108	105	105	105	105	110	105	120	120	115	115	115	110	118	112	108	100	105	105	110	105	105	105	108	
UQ	115	110	110	125	110	115	140	150	135	120	120	120	120	120	115	120	105	110	105	115	110	115	115	115	
LQ	100	100	100	100	100	108	100	110	110	110	108	110	105	105	100	100	100	100	100	100	105	102	105	102	

DEC. 1982

H<sup>°</sup>ES (KM)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1982      TYPES OF ES

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 20 MHz in 20sec 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 <sub>1</sub>	L <sub>1</sub>			L <sub>2</sub>		L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>			F <sub>1</sub>	F <sub>2</sub>			F <sub>2</sub>	
2	F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>					C <sub>1</sub>				L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>		L <sub>1</sub>	L <sub>2</sub>	F <sub>2</sub>							
3					F <sub>1</sub>					L <sub>3</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	C <sub>1</sub>			L <sub>1</sub>			F <sub>1</sub>	F <sub>1</sub>	F <sub>3</sub>	F <sub>2</sub>		
4			F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>			L <sub>1</sub>		L <sub>1</sub>	L <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>					F <sub>1</sub>	
5			F <sub>1</sub>			F <sub>1</sub>					H <sub>1</sub>	C <sub>1</sub>				L <sub>1</sub>	L <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>						
6		F <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>						L <sub>1</sub>							L <sub>1</sub>	F <sub>1</sub>			F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	
7	F <sub>2</sub>	F <sub>1</sub>						C <sub>1</sub>			L <sub>1</sub>	C <sub>1</sub>	L <sub>2</sub>												
8								L <sub>1</sub>				L <sub>1</sub>					L <sub>1</sub>	L <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>					
9	F <sub>1</sub>				F <sub>4</sub>	F <sub>2</sub>	F <sub>1</sub>	C <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	C <sub>2</sub>				C <sub>1</sub>		L <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>				F <sub>2</sub>	
10	F <sub>2</sub>	F <sub>1</sub>						C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>		C <sub>1</sub>	C <sub>1</sub>		L <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>		F <sub>1</sub>	F <sub>1</sub>			
11	F <sub>1</sub>	F <sub>2</sub>	F <sub>1</sub>					CL <sub>11</sub>		L <sub>3</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>2</sub>			C <sub>3</sub>	L <sub>4</sub>	F <sub>1</sub>	F <sub>4</sub>	FF <sub>12</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>2</sub>	
12		F <sub>2</sub>		F <sub>1</sub>	F <sub>1</sub>		F <sub>1</sub>	LC <sub>11</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	L <sub>1</sub>	C <sub>2</sub>	C <sub>2</sub>	L <sub>1</sub>	L <sub>1</sub>			F <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>			
13	F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>1</sub>	L <sub>2</sub>	CL <sub>12</sub>	L <sub>2</sub>	F <sub>1</sub>	F <sub>4</sub>	F <sub>1</sub>					
14				F <sub>2</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>3</sub>			L <sub>1</sub>		L <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>					F <sub>2</sub>	
15	F <sub>2</sub>				F <sub>1</sub>				C <sub>1</sub>						L <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	F <sub>4</sub>	F <sub>3</sub>	F <sub>2</sub>		F <sub>2</sub>	F <sub>3</sub>	F <sub>2</sub>	
16	F <sub>2</sub>	F <sub>4</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>1</sub>			L <sub>1</sub>	L <sub>1</sub>	CL <sub>11</sub>			L <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	CL <sub>11</sub>	F <sub>4</sub>	F <sub>1</sub>	F <sub>3</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>1</sub>	
17	F <sub>1</sub>			F <sub>2</sub>				CL <sub>21</sub>			C <sub>2</sub>	C <sub>1</sub>					CL <sub>11</sub>	L <sub>1</sub>	F <sub>1</sub>						
18					F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	L <sub>1</sub>	C <sub>1</sub>	L <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	CL <sub>11</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	L <sub>1</sub>	F <sub>1</sub>	F <sub>4</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>4</sub>	FF <sub>11</sub>	F <sub>2</sub>	
19	F <sub>3</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	L <sub>5</sub>	C <sub>3</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>		L <sub>1</sub>	C <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>	FF <sub>21</sub>	
20	F <sub>2</sub>	F <sub>1</sub>		F <sub>1</sub>	FF <sub>22</sub>			L <sub>1</sub>	L <sub>1</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>4</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>1</sub>	
21	F <sub>1</sub>	F <sub>1</sub>		F <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>		CL <sub>11</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>				
22			F <sub>2</sub>				F <sub>1</sub>	LC <sub>22</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>1</sub>	CL <sub>11</sub>	C <sub>2</sub>	CL <sub>11</sub>	L <sub>1</sub>	F <sub>2</sub>	F <sub>1</sub>						
23										HL <sub>11</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>2</sub>								F <sub>2</sub>	F <sub>4</sub>	F <sub>3</sub>	F <sub>1</sub>	
24		F <sub>2</sub>						L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>						L <sub>1</sub>	F <sub>1</sub>							
25		F <sub>1</sub>				F <sub>1</sub>		C <sub>1</sub>		C <sub>2</sub>	L <sub>1</sub>	C <sub>1</sub>				L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>1</sub>			
26		F <sub>2</sub>	F <sub>1</sub>		F <sub>3</sub>			C <sub>2</sub>	C <sub>1</sub>		L <sub>2</sub>		C <sub>1</sub>	CL <sub>21</sub>	CL <sub>21</sub>	L <sub>1</sub>	L <sub>1</sub>	F <sub>1</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>2</sub>			F <sub>1</sub>	
27		F <sub>1</sub>			F <sub>2</sub>	F <sub>2</sub>		L <sub>1</sub>	L <sub>1</sub>				C <sub>1</sub>				C <sub>1</sub>	L <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>		F <sub>2</sub>	F <sub>3</sub>	F <sub>2</sub>	
28		F <sub>1</sub>	F <sub>1</sub>		F <sub>1</sub>	F <sub>2</sub>		C <sub>1</sub>		C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>		C <sub>1</sub>	C <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	F <sub>1</sub>		F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>	
29	F <sub>1</sub>	F <sub>2</sub>			F <sub>1</sub>		F <sub>1</sub>	L <sub>1</sub>				L <sub>1</sub>					L <sub>1</sub>	L <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>		F <sub>2</sub>	
30	F <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>1</sub>			C <sub>2</sub>	L <sub>4</sub>	F <sub>3</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>		
31		F <sub>1</sub>	F <sub>1</sub>					L <sub>1</sub>		L <sub>1</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	L <sub>1</sub>			L <sub>1</sub>	L <sub>1</sub>				F <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	
	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																									

DEC. 1982      TYPES OF ES

# IONOSPHERIC DATA

DEC. 1982

FXI (0.1 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA							Lat.	39 43.5 N			Long	140 08.0 E			Sweep 1 MHz to 20 MHz in 20sec 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 42	X 44	X 48	X 48	X 42	X 33	X 38											X 66	X 56	A	X 48	X 36	X 38	X 39		
2	X 41	X 40	X 40	X 41	X 41	X 38	X 42											X 63	X 58	X 43	X 40	X 34	X 32	X 34		
3	X 35	X 37	X 40	X 41	X 36	X 33	X 36											X 57	X 46	X 47	X 43	X 42	X 35	X 38		
4	X 37	X 37	X 38	X 41	X 41	X 41	X 43											X 58	X 50	X 49	X 47	X 43	X 37	X 38		
5	X 40	X 38	X 39	X 39	X 39	X 40	X 43											X 80	X 70	X 68	X 56	X 43	X 44	X 44		
6	X 45	X 47	X 48	X 50	X 49	X 48	X 49											X 66	X 57	X 57	X 52	X 46	X 46	X 48		
7	X 47	X 47	X 49	X 50	X 53	X 51	X 53											X 79	X 72	X 53	X 44	X 37	X 37	X 37		
8	X 37	X 38	X 40	X 42	X 43	X 39	X 47											X 90	X 73	X 86	X 53	X 42	X 44	X 44		
9	X 43	X 43	X 43	X 42	X 42	X 44	X 42											X 88	X 63	X 56	X 51	X 44	X 39	X 40		
10	X 38	X 40	X 43	X 41	X 41	X 33	X 35											X 86	X 71	X 61	X 54	X 62	X 62	X 65		
11	X 61	X 49	X 46	X 47	X 49	X 53	X 38											X 86	X 68	X 61	X 58	X 53	X 50	X 49		
12	X 43	X 43	X 43	X 46	X 48	X 49	X 50											X 96	X 87	X 68	X 57	X 42	X 40	X 41		
13	X 43	X 40	X 41	X 38	X 38	X 41	X 40											X 68	X 53	X 44	X 48	X 42	X 47	X 43		
14	48	48	50	53	51	53	57	77										X 93	X 69	X 57	X 49	X 37	X 37	X 40		
15	X 40	X 41	X 43	X 43	X 37	X 39	X 41											X 68	X 53	X 58	X 61	X 48	X 46	X 46		
16	X 48	X 49	X 50	X 51	X 51	X 51	X 50											X 86	X 71	X 63	X 39	X 37	X 39	X 37		
17	X 38	X 38	X 38	X 38	X 39	X 41	X 43											X 94	X 81	X 59	X 49	X 49	X 57	X 61		
18	X 57	X 59	X 56	X 67	X 53	X 53	X 41											X 80	X 78	X 80	X 78	X 68	X 70	X 73		
19	X 47	A	A	X 38	X 37	X 50	X 53											X 78	X 81	X 78	X 59	X 44	X 50	X 48		
20	X 50	X 61	X 40	X 31	X 31	X 30	X 32											100	X 82	X 79	X 33	X 34	X 36	X 35		
21	X 35	X 35	X 30	A	X 32	X 31	X 36											X 72	X 81	X 64	X 43	X 43	X 44	X 46		
22	X 42	X 42	X 42	X 42	X 38	X 35	X 40											X 75	X 61	X 63	X 56	X 38	X 39	X 41		
23	X 40	X 39	X 39	X 41	X 43	X 39	A											X 66	X 61	X 59	X 51	X 45	X 36	X 41		
24	X 38	X 38	X 37	X 36	X 34	X 34	X 38											X 58	X 44	X 57	X 44	X 36	X 37	X 38		
25	X 37	X 39	X 38	X 38	X 41	X 42	X 42											X 68	X 55	X 49	X 50	X 41	X 36	X 35		
26	X 36	X 37	X 38	X 38	X 36	X 36	X 37											X 63	X 63	X 59	X 40	X 37	A	X 41		
27	X 38	X 40	X 41	X 41	X 39	X 40	X 43											X 65	X 66	X 56	X 43	X 40	X 38	X 38		
28	X 41	X 46	X 48	X 40	X 37	X 37	X 38											X 74	X 62	X 55	X 45	X 42	X 47	X 46		
29	X 46	X 44	X 46	X 47	X 50	X 37	X 37											X 85	X 93	X 54	X 33	X 37	X 38	X 34		
30	X 35	X 35	X 36	X 38	A	X 32	X 30											X 63	X 64	X 57	X 39	X 41	X 38	X 37		
31	X 39	X 39	X 40	X 39	X 41	X 41	X 38											X 70	X 71	X 57	X 36	X 38	X 37	X 38		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	30	30	30	30	31	30	1										31	31	30	31	31	30	31		
MED	X 41	X 40	X 41	X 41	X 41	X 40	X 41	77										X 74	X 66	X 58	X 48	X 42	X 39	X 41		
UQ	X 46	X 46	X 46	X 47	X 48	X 46	X 43											X 86	X 72	X 63	X 54	X 44	X 46	X 46		
LQ	X 38	X 38	X 39	X 38	X 37	X 36	X 38											X 66	X 58	X 55	X 43	X 37	X 37	X 38		

DEC. 1982

FXI (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1982

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	AKITA																							Lat.	39° 43.5' N		Long	140° 08.0' E		Sweep	1	MHz to 20		MHz in 20		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	36	38	42	42	36	27	32	69	92	117	119	115	102	97	98	98	77	60	50	A	42	30	32	33																				
2	35	34	34	35	35	32	36	70	87	102	96	112	H 90	98	C	86	85	57	52	37	34	28	26	28																				
3	29	31	34	35	30	27	30	65	92	90	98	97	102	104	91	82	84	51	40	41	37	36	29	32																				
4	31	31	32	35	35	35	37	64	93	103	105	117	111	108	92	93	87	52	44	43	41	37	31	32																				
5	34	32	33	33	33	34	37	76	89	93	122	126	105	116	116	106	85	74	64	62	50	37	38	38																				
6	39	41	42	44	43	42	43	75	87	102	113	122	104	108	93	85	79	60	51	51	46	40	40	42																				
7	41	41	43	44	47	45	47	70	93	104	113	115	113	107	115	101	93	73	66	47	38	31	31	31																				
8	31	32	34	36	37	33	41	70	112	110	146	142	124	122	113	108	105	84	67	80	47	36	38	38																				
9	37	37	37	36	36	38	36	87	112	144	140	148	143	134	133	120	100	82	57	50	45	38	33	34																				
10	32	34	37	35	35	27	29	67	108	122	138	142	137	123	125	116	98	80	65	55	48	56	56	59																				
11	55	43	40	41	43	47	32	62	78	110	131	137	137	130	126	108	97	80	62	55	52	47	44	43																				
12	37	37	F 35	F 35	F	F 36	F 37	69	97	145	146	137	126	133	129	120	107	90	81	62	51	36	34	35																				
13	37	34	35	32	32	35	34	71	96	103	132	125	117	111	102	98	85	62	47	38	42	36	F 37	37																				
14	F	F	F 42	F	F	F	F 49	F 68	89	107	127	120	116	105	107	113	94	87	63	51	43	31	31	34																				
15	34	35	37	37	31	F	35	64	83	109	130	126	119	105	97	105	87	62	47	52	55	42	40	40																				
16	42	43	44	45	45	45	44	74	96	97	121	132	131	108	98	108	86	80	65	57	33	31	33	31																				
17	32	32	32	32	33	35	37	67	109	152	145	143	121	135	123	124	108	88	75	53	43	43	51	55																				
18	51	53	50	61	H 47	47	35	69	127	142	159	130	114	122	126	117	89	74	72	74	72	62	64	67																				
19	41	A	A	32	31	44	47	75	112	147	164	150	138	130	128	110	87	72	75	72	53	38	44	42																				
20	44	55	34	25	25	24	26	71	98	123	124	140	133	117	122	99	93	94	76	73	27	28	30	29																				
21	29	29	24	A	26	25	30	58	111	134	122	132	132	128	113	102	91	66	75	58	37	37	38	40																				
22	36	36	36	36	32	29	34	51	108	107	127	H 132	128	H 126	122	114	104	69	55	57	50	32	33	35																				
23	34	33	33	35	37	33	A	53	81	H 107	125	126	109	107	104	100	85	60	55	53	45	39	30	F 32																				
24	32	32	31	30	28	28	32	60	87	116	130	144	138	113	H 106	102	81	52	38	51	38	30	31	32																				
25	31	33	32	32	35	36	36	65	94	107	128	125	111	102	107	106	76	62	49	43	44	35	30	29																				
26	30	31	32	32	30	30	31	62	100	H 109	97	110	121	98	100	91	76	57	57	53	34	31	A	35																				
27	32	34	35	35	33	34	37	61	80	93	123	117	111	98	109	99	76	59	60	50	37	34	32	32																				
28	35	40	42	34	31	31	32	64	86	97	120	108	107	94	94	104	85	68	56	49	39	36	41	40																				
29	40	38	40	41	44	31	31	57	96	120	124	117	117	124	110	87	93	79	87	48	27	31	32	28																				
30	29	29	30	32	A	26	24	52	93	119	117	108	100	100	100	96	78	57	58	51	33	35	32	31																				
31	33	33	34	33	35	35	32	56	76	112	131	124	96	112	111	76	64	64	65	51	30	32	31	32																				
	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	29	28	29	30	31	31	31	31	31	31	31	31	30	31	31	31	31	30	31	31	30	31																			
MED	34	34	35	35	35	34	35	67	93	109	125	126	117	111	110	102	87	68	60	52	42	36	33	34																				
UQ	39	38	40	37	37	36	37	70	104	121	132	137	130	124	122	109	94	80	66	57	48	38	40	40																				
LQ	32	32	33	32	31	29	32	62	87	103	120	117	108	104	100	97	82	60	52	49	37	31	31	32																				

DEC. 1982

FOF2 (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

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

DEC. 1982

FOF1 (0.01 MHz)

### IONOSPHERIC DATA

DEC. 1982

FOE (0.01 MHz)

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

Station **AKITA** Lat. **39 43.5 N** Long **140 08.0 E** Sweep 1 MHz to 20 MHz in 20sec 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	245	290	315	330	340	325	300	250	S							
2								S	240	280	315	330	340	335	C	245	S							
3								S	240	285	330	340	A	A	A	255	S							
4								S	A	A	A	A	A	315	300	A	A							
5								S	240	280	305	330	A	A	305	270	A							
6								S	250	295	315	340	350	320	305	260	S							
7								S	250	285	A	A	A	A	315	A	S							
8								S	A	B	A	A	A	A	310	270	A							
9								A	A	A	325	A	A	A	A	A	S							
10								S	250	295	315	A	A	A	B	310	210							
11								S	A	A	A	A	A	A	B	A	175							
12								S	240	300	320	345	A	A	A	A	S							
13								A	225	265	305	340	A	A	A	275	195							
14								S	A	290	A	325	340	315	A	A	A							
15								S	240	290	315	390	A	A	285	250	S							
16								S	255	305	A	A	A	345	A	255	S							
17								A	235	260	300	330	A	A	A	255	S							
18								S	255	A	A	A	A	A	A	255	A							
19								S	A	A	A	A	A	A	A	A	S							
20								S	255	A	325	345	A	A	A	A	S							
21								A	A	270	A	A	A	A	A	A	S							
22								S	A	A	A	330	A	A	A	A	A							
23								S	220	280	310	330	A	A	A	255	200							
24								S	230	A	A	A	A	310	285	245	S							
25								S	230	275	A	335	345	A	A	A	205							
26								S	230	285	A	340	345	330	A	A	S							
27								S	A	250	A	315	A	A	A	A	S							
28								S	A	A	A	A	A	B	305	255	S							
29								S	A	A	A	B	B	B	I B 300	260	A							
30								S	A	A	315	I B 335	345	335	305	260	175							
31								S	215	280	310	325	A	315	295	260	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									19	19	15	18	7	10	12	18	6							
MED									240	285	315	332	345	322	302	255	198							
UQ									250	290	318	340	345	335	305	260	205							
LQ									230	278	310	330	340	315	298	255	175							

DEC. 1982

FOE (0.01 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOES (0.1 MHz)

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

Station		AKITA							Lat. 39 43.5 N		Long 140 08.0 E		Sweep 1 MHz to 20 MHz in 20sec 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 15	E 15	E 13	E 13	E 12	E 15	E 15	E 16	G	G	G	G	G	G	G	J 27	J 27	J 25	J 26	J 30	J 24	J 20	E 16	
2	E 17	J 22	J 19	E 14	E 14	E 16	E 15	E 16	G	G	G	G	G	39	C	G	J 31	J 29	J 24	E 15	E 16	J 26	E 16	E 15
3	E 15	E 15	E 12	E 15	E 15	E 15	E 15	E 16	G	G	37	G	J 54	J 52	J 48	J 46	J 52	J 19	E 16	J 21	E 15	J 24	J 24	J 33
4	J 26	J 23	J 21	J 24	E 16	E 16	E 16	G	J 44	J 51	J 44	J 39	J 50	G	G	J 43	J 44	J 30	J 51	J 25	E 16	E 16	J 22	J 26
5	J 25	E 14	E 16	E 13	E 16	E 16	E 16	E 16	31	G	J 51	J 47	J 39	J 34	G	J 37	J 33	J 24	J 20	E 16	J 24	E 16	E 16	E 16
6	E 15	J 24	J 16	J 29	J 24	E 15	E 15	E 18	G	G	G	G	G	G	G	J 24	J 24	J 19	E 15	E 15	E 15	E 15	E 15	J 31
7	E 16	J 24	J 40	J 25	J 24	J 24	J 20	E 16	G	J 44	J 62	J 43	41	41	G	34	E 16	J 24	J 20	E 16	J 19	J 20	E 16	E 16
8	J 21	J 26	J 20	J 24	J 17	E 15	E 15	J 25	31	E 47	42	J 59	J 47	J 36	G	G	J 24	J 24	J 34	J 30	J 17	E 15	E 16	E 15
9	E 16	E 16	J 31	E 16	E 16	E 16	E 16	J 22	31	J 44	G	J 43	J 54	J 62	40	J 53	E 16	J 24	J 27	J 24	J 21	J 24	E 16	E 16
10	J 23	J 21	J 26	J 44	J 24	E 16	E 16	E 16	G	36	41	J 50	41	J 42	E 38	G	G	J 22	J 29	J 22	E 16	J 24	E 16	E 16
11	E 15	E 15	E 13	E 15	E 13	E 15	E 15	E 18	30	J 47	J 44	J 54	J 75	J 40	44	J 29	G	E 15	J 38	J 106	J 34	E 15	J 24	J 21
12	E 16	E 16	E 16	J 21	J 31	J 20	J 53	E 16	G	G	G	J 62	J 92	J 60	J 60	J 61	J 52	J 44	E 16	E 16	J 31	J 34	J 20	J 24
13	J 23	J 21	J 23	J 24	J 26	E 16	E 16	J 25	G	G	39	38	39	38	35	G	G	E 15	J 27	J 31	J 58	J 22	E 16	E 16
14	J 22	J 20	J 20	E 14	E 15	J 21	E 16	E 16	J 50	J 47	J 44	G	39	39	J 50	J 44	32	J 25	J 33	E 16	J 31	E 16	E 16	E 16
15	E 16	E 16	E 16	J 20	J 25	J 20	E 16	E 16	G	J 65	G	G	J 44	J 42	J 41	G	E 18	J 30	J 24	J 30	J 21	E 16	J 33	J 46
16	J 36	J 26	J 24	J 28	E 15	E 15	E 15	E 16	G	G	37	J 47	J 36	G	J 38	G	J 35	J 32	J 20	J 27	J 24	E 15	J 24	J 32
17	E 16	E 16	J 25	J 24	J 25	E 16	E 16	J 24	G	J 38	G	J 46	J 46	J 53	J 46	G	J 41	J 49	J 27	J 60	J 20	J 28	J 27	J 28
18	J 19	J 26	E 15	E 15	E 15	E 16	E 15	E 17	29	J 54	J 74	J 88	J 84	J 41	J 36	G	J 25	J 102	J 28	J 24	J 45	J 31	J 44	J 24
19	J 44	J 64	J 65	J 51	J 30	E 16	E 16	E 16	32	J 111	J 97	J 90	J 54	J 40	J 34	J 45	E 17	J 84	J 90	J 44	J 40	J 30	J 25	J 24
20	J 61	J 30	J 20	J 13	J 19	J 25	J 24	E 18	G	32	G	G	36	40	J 66	J 52	J 45	J 31	J 50	J 44	J 27	J 24	J 24	J 21
21	E 16	E 16	E 16	J 77	J 25	J 26	J 25	J 25	26	35	38	J 84	J 94	J 64	J 66	J 70	J 94	J 27	J 21	J 24	J 29	J 24	E 16	E 16
22	E 15	E 15	J 24	J 24	J 24	J 18	J 21	J 29	J 32	J 32	J 47	G	37	45	37	144	J 21	J 20	J 41	J 27	J 21	J 20	J 19	J 21
23	E 16	E 16	J 25	J 24	J 47	J 33	J 39	J 21	G	G	G	G	27	38	35	32	G	G	E 16	J 21	E 16	E 16	J 29	E 16
24	J 42	J 24	E 15	E 15	E 15	E 15	E 15	E 16	G	30	J 47	J 52	J 71	G	G	G	J 29	E 15	E 15	E 16	E 15	E 15	E 15	E 15
25	E 15	E 13	J 26	J 24	J 19	J 24	E 15	E 17	G	G	J 36	G	G	40	32	J 39	G	J 36	E 15	E 15	E 15	E 15	E 15	E 15
26	E 15	E 15	E 15	J 21	E 15	J 19	J 24	J 20	G	G	36	36	G	G	J 44	32	J 24	J 19	J 32	J 24	J 87	J 53	J 50	E 15
27	J 21	J 20	J 25	J 30	J 24	J 24	E 16	E 16	25	G	40	37	39	36	35	30	E 17	E 16	E 16	E 16	J 54	J 21	J 52	J 40
28	J 26	J 24	J 20	E 15	E 15	J 24	E 15	E 15	29	35	40	35	36	E 36	G	G	E 19	J 24	E 15	E 15	J 52	J 40	J 44	J 54
29	J 24	E 16	E 16	J 12	E 16	E 16	E 16	E 16	26	28	40	E 36	E 33	E 34	E 32	G	28	E 16	E 13	J 21	J 27	J 24	J 25	E 16
30	E 15	J 21	J 31	J 44	J 49	J 21	E 15	E 15	J 30	J 31	G	E 45	G	G	G	G	J 24	J 30	J 24	E 15	J 53	J 51	E 15	E 15
31	E 15	E 13	E 15	J 21	E 13	E 15	E 15	E 16	G	G	G	G	J 46	G	G	G	E 19	E 15	E 16	E 15	E 15	E 15	J 54	J 26
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	E 16	J 20	J 20	J 21	J 17	E 16	E 16	E 16	G	30	38	38	39	39	34	G	J 24	J 24	J 24	J 24	J 21	J 24	J 20	E 16
UQ	J 24	J 24	J 25	J 26	J 24	J 21	E 16	19	30	J 42	J 44	J 48	J 52	J 42	J 44	J 44	J 34	J 30	J 31	J 28	J 31	J 27	J 26	J 26
LQ	E 15	E 16	E 16	E 15	E 15	E 16	E 15	E 16	G	G	G	G	36	E 30	G	G	E 16	J 19	18	E 16	E 16	E 16	E 16	E 16

DEC. 1982

FOES (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

FBES (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station AKITA Lat. 39° 43' 5" N Long 140° 08' 0" E Sweep 1 MHz to 20 MHz in 20sec 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 15	E S 15	E S 13	E S 13	E S 12	E S 15	E S 15	E S 16	G	G	G	G	G	G	G	G	21	E	E A 76	E	E	E	E S 16	
2	E S 17	E	E	E S 14	E S 14	E S 16	E S 15	E S 16	G	G	G	G	G	39	C	G	21	E	E E S 15	E S 16	E	E S 16	E S 15	
3	E S 15	E S 15	E S 12	E S 15	E S 15	E S 15	E S 15	E S 16	G	G	36	G	35	40	45	30	19	E	E S 16	19	E S 15	E	E	
4	E	E	E	E	E S 16	E S 16	E S 16	G	40	30	34	35	34	G	G	30	32	E	20	20	E S 16	E S 16	E	
5	E	E S 14	E S 16	E S 13	E S 16	E S 16	E S 16	E S 16	28	G	37	42	38	34	G	G	30	20	18	E	E S 16	20	E S 16	E S 16
6	E S 15	E	E	E	E	E S 15	E S 15	E S 18	G	G	G	G	G	G	G	G	G	E	E	E S 15	E S 15	E S 15	E S 15	E
7	E S 16	E	18	E	E	E	E	E S 16	G	32	35	35	36	38	G	29	E S 16	E	E	E S 16	E	E	E	E S 16
8	20	E	E	E	E	E S 15	E S 15	20	30	E B 47	39	38	37	36	G	G	21	E	22	19	E	E S 15	E S 16	E S 15
9	E S 16	E S 16	E	E S 16	E S 16	E S 16	E S 16	20	29	41	G	37	45	43	35	28	E S 16	E	E	20	E	E	E S 16	E S 16
10	E	E	E	E	E	E S 16	E S 16	E S 16	G	32	40	42	40	42	E B 38	G	G	E	E	E	E S 16	E	E S 16	E S 16
11	E S 15	E S 15	E S 13	E S 15	E S 13	E S 15	E S 15	E S 18	29	42	35	42	36	38	43	29	G	E S 15	35	28	E	E S 15	E	E
12	E S 16	E S 16	E S 16	E	E	E	E	E S 16	G	G	G	60	38	40	56	53	40	30	E S 16	E S 16	E	E	E	E
13	E	E	E	E	E	E S 16	E S 16	19	G	G	34	37	37	37	33	G	G	E S 15	E	25	23	E	E S 16	E S 16
14	E	E	E	E S 14	E S 15	E	E S 16	E S 16	30	32	35	G	38	34	31	30	21	E	22	E S 16	E	E S 16	E S 16	E S 16
15	E S 16	E S 16	E S 16	E	E	E	E S 16	E S 16	G	20	6	G	36	33	33	G	E S 18	16	19	E	E	E S 16	E	E
16	E	E	E	E	E S 15	E S 15	E S 15	E S 16	G	G	35	36	36	G	35	G	20	20	E	E	E	E S 15	E	E
17	E S 16	E S 16	E	E	E	E S 16	E S 16	19	G	30	G	42	45	37	35	G	21	30	19	42	E	E	E	20
18	E	19	E S 15	E S 15	E S 15	E S 16	E S 15	E S 17	29	35	37	36	35	35	33	G	24	E	20	19	25	20	35	E
19	31	A A 64	A A 65	E	E	E S 16	E S 16	E S 16	30	88	78	43	42	34	31	35	E S 17	35	45	25	29	21	E	E
20	25	E	E	E S 13	E	E	E	E S 18	G	32	G	G	36	38	35	33	21	28	30	30	18	E	E	E
21	E S 16	E S 16	E S 16	A A 77	18	18	17	20	26	35	37	45	90	46	60	70	22	19	18	21	E	E	E	E S 16
22	E S 15	E S 15	E	E	E	E	E	25	29	32	40	G	37	38	35	45	21	E	19	20	19	E	E	E
23	E S 16	E S 16	E	20	20	E	A A 39	18	G	G	G	26	37	35	31	G	G	E S 16	E	E S 16	E S 16	E	E S 16	E S 16
24	20	E	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16	G	29	34	35	35	G	G	G	19	E S 15	E S 15	E S 16	E S 15	E S 15	E S 15	E S 15
25	E S 15	E S 13	E	E	E	E	E S 15	E S 17	G	G	32	G	G	35	32	30	G	20	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
26	E S 15	E S 15	E S 15	E	E S 15	E	E	18	G	G	35	36	G	25	34	28	22	E	24	19	20	E	A A 50	E S 15
27	E	E	16	16	E	E	E S 16	E S 16	25	G	36	36	36	35	35	30	E S 17	E S 16	E S 16	E S 16	E	E	19	21
28	20	20	E	E S 15	E S 15	E	E S 15	E S 15	28	33	35	35	36	E B 36	G	G	E S 19	E	E S 15	E S 15	20	E	24	E
29	E	E S 16	E S 16	E	E S 12	E S 16	E S 16	E S 16	25	28	40	E B 36	E B 33	E B 34	E B 32	G	22	E S 16	E S 13	E	E	E	19	E S 16
30	E S 15	E	19	25	A A 49	E	E S 15	E S 15	25	30	G	E B 45	G	G	G	G	G	E	E	E	E S 15	E	E	E S 15
31	E S 15	E S 13	E S 15	E	E S 13	E S 15	E S 15	E S 16	G	G	G	G	35	G	G	G	E S 19	E S 15	E S 16	E S 15	E S 15	E S 15	25	19
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	E S 15	E 14	E 12	E	E E 13	E S 15	E S 15	E S 16	G	28	35	36	36	35	32	G	19	E 15	16	16	E 15	E 15	E S 15	E S 15
UQ	E S 16	E S 16	E S 16	E S 15	E S 15	E S 16	E S 16	18	28	32	36	39	38	38	35	30	21	18	20	20	E S 16	E S 15	E S 16	E S 16
LQ	E	E	E	E	E	E	E S 15	E S 16	G	G	G	G	34	U 27	G	G	E G 16	E	E	E S 15	E	E	E	E

DEC. 1982

FBES (0.1 MHz)



# IONOSPHERIC DATA

DEC. 1982

F-MIN (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA		Lat. 39° 43' 5" N		Long. 140° 08' 0" E		Sweep 1		MHz to 20 MHz		in 20sec		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 15	E 15	E 13	E 13	E 12	E 15	E 15	E 16		16	16	16	16	17	16	16	17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
2	E 17	E 15	E 15	E 14	E 14	E 16	E 15	E 16		13	16	16	18	16	18		16	E 15	E 15	E 15	E 15	E 16	E 14	E 16	E 15
3	E 15	E 15	E 12	E 15	E 15	E 15	E 15	E 16		15	16	17	17	17	16	16	15	E 16	E 15	E 16	E 15	E 15	E 15	E 15	E 15
4	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16		16	16	12	16	16	17	16	16	E 16	E 15	E 16	E 16	E 16	E 16	E 16	E 16
5	E 16	E 14	E 16	E 13	E 16	E 16	E 16	E 16		16	16	16	17	17	20	18	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
6	E 15	E 15	E 13	E 15	E 15	E 15	E 15	E 18		16	16	16	17	18	16	16	16	E 16	E 15	E 15	E 15	E 15	E 15	E 15	E 15
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16		16	16	17	16	21	25	16	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
8	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 18		16	47	31	21	25	19	17	16	E 15	E 15	E 15	E 15	E 15	E 15	E 16	E 15
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16		16	17	22	20	23	20	20	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
10	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16		16	17	20	23	27	23	38	20	E 16	E 15	E 16	E 16	E 16	E 16	E 16	E 16
11	E 15	E 15	E 13	E 15	E 13	E 15	E 15	E 18		16	17	18	19	20	17	34	16	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 15
12	E 16	E 16	E 16	E 16	E 15	E 16	E 16	E 16		16	16	16	18	18	20	17	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
13	E 16	E 16	E 16	E 12	E 15	E 16	E 16	E 16		16	16	21	19	16	19	19	16	E 16	E 15	E 16	E 16	E 16	E 16	E 16	E 16
14	E 16	E 16	E 14	E 14	E 15	E 15	E 16	E 16		16	19	21	21	21	20	18	17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16		18	18	16	21	20	17	18	16	E 18	E 11	E 16	E 16	E 16	E 16	E 16	E 16
16	E 15	E 15	E 12	E 15	E 15	E 15	E 15	E 16		16	16	19	16	18	17	16	16	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 15
17	E 16	E 16	E 16	E 15	E 15	E 16	E 16	E 16		16	16	16	25	18	17	19	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
18	E 15	E 15	E 15	E 15	E 15	E 16	E 15	E 17		18	16	19	18	19	17	17	16	E 16	E 15	E 15	E 15	E 15	E 15	E 16	E 15
19	E 16	E 12	E 12	E 16	E 16	E 16	E 16	E 16		16	18	22	20	21	21	20	18	E 17	E 16	E 16	E 16	E 16	E 16	E 16	E 16
20	E 15	E 15	E 15	E 13	E 15	E 15	E 15	E 18		19	22	27	28	26	25	22	18	E 16	E 15	E 15	E 15	E 15	E 16	E 15	E 15
21	E 16	E 16	E 16	E 12	E 15	E 16	E 12	E 16		16	19	18	18	18	21	21	E 17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
22	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 15		16	17	19	20	20	18	17	18	E 16	E 15	E 15	E 15	E 15	E 15	E 15	E 15
23	E 16	E 16	E 16	E 16	E 14	E 16	E 16	E 16		16	16	16	17	20	16	19	18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
24	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 16		16	16	18	20	20	20	17	16	E 16	E 15	E 15	E 16	E 15	E 15	E 15	E 15
25	E 15	E 13	E 15	E 13	E 15	E 15	E 15	E 17		17	16	16	19	19	19	19	16	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 15
26	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 16		E 17	18	17	19	22	17	18	16	E 15	E 16	E 17	E 16	E 15	E 15	E 15	E 15
27	E 16	E 16	E 12	E 12	E 16	E 16	E 16	E 16		16	18	21	25	23	25	19	19	E 17	E 16	E 16	E 16	E 16	E 16	E 16	E 16
28	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 15		19	23	26	26	28	36	24	20	E 19	E 15	E 15	E 15	E 15	E 15	E 15	E 15
29	E 16	E 16	E 16	E 16	E 12	E 16	E 16	E 16		20	22	26	36	33	34	32	19	E 16	E 16	E 13	E 16	E 16	E 16	E 16	E 16
30	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 15		16	17	19	45	21	20	19	17	E 16	E 15	E 15	E 15	E 15	E 15	E 15	E 15
31	E 15	E 13	E 15	E 13	E 13	E 15	E 15	E 16		16	17	17	17	16	17	19	17	E 19	E 15	E 16	E 15	E 15	E 15	E 15	E 15
	00	01	02	03	04	05	06	07		08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31		31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31
MED	E 16	E 15	E 15	E 15	E 15	E 16	E 15	E 16		16	17	18	19	20	19	18	16	E 16	E 15	E 16	E 16	E 16	E 16	E 16	E 16
UQ	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16		16	18	21	21	22	20	20	18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
LQ	E 15	E 15	E 14	E 14	E 15	E 15	E 15	E 16		16	16	16	17	18	17	17	16	E 16	E 15	E 15	E 15	E 15	E 15	E 15	E 15

DEC. 1982

F-MIN (0.1 MHz)

The Radio Research Laboratories, Japan

### IONOSPHERIC DATA

DEC. 1982

M(3000)F2 (0.01)

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

Station AKITA Lat. 39 43.5 N, Long 140 08.0 E Sweep 1 MHz to 20 MHz in 20sec 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	260	265	300	320	340	275	280	330	345	335	340	340	325	320	325	350	340	320	315	A	330	265	280	285		
2	270	275	280	285	300	270	275	350	350	345	345	330	305 <sup>H</sup>	330	C	330	345	315	330	330	330	325	275	265		
3	275	260	300	335	300	275	285	340	325	345	355	315	315	325	340	320	355	325	305	315	295	305	275	260		
4	260	270	275	280	285	285	300	315	360	335	325	325	315	310	325	305	335	300	305	305	305	300	260	260		
5	270	275	270	270	280	280	300	330	330	295	295	315	295	300	305	305	315	295	295	315	320	300	290	290		
6	275	280	270	285	290	295	310	335	350	360	310	305	290	325	310	320	335	320	305	305	315	290	290	270		
7	275	270	280	280	280	285	320	350	355	335	325	320	320	315	320	310	310	320	325	310	310	260	260	240		
8	255	250	265	245	260	250	285	300	310	300	315	310	300	305	310	315	290	315	275	330	350	255	265	255		
9	255	255	250	260	250	275	255	310	310	325	290	305	290	290	300	305	310	310	310	315	300	290	270	270		
10	240	265	270	285	320	290	290	330	335	335	320	310	290	325	320	315	315	285	310	275	230	245	240	270		
11	310	240	230	235	230	290	290	330	325	315	300	290	295	290	300	295	310	300	300	275	290	295	295	295		
12	285	255	F	F	F	F	F	F	310	310	320	310	295	305	300	300	310	300	310	325	325	260	275	270		
13	290	295	290	285	270	280	295	330	335	320	320	320	315	315	315	315	315	310	300	295	300	285	F	270		
14	F	F	F	F	F	F	F	F	F	340	345	325	330	320	320	305	305	310	315	310	320	300	330	285	280	280
15	275	280	310	300	290	F	295	330	320	330	325	320	310	280	300	305	320	305	275	275	330	285	280	275		
16	275	270	265	280	280	275	300	325	330	330	315	325	320	295	295	315	310	305	305	335	335	265	270	260		
17	255	260	255	260	270	260	265	295	305	310	310	305	280	300	300	300	315	295	305	290	260	245	270	285		
18	240	265	270	280	255 <sup>H</sup>	285	255	305	335	340	330	335	315	325	315	330	325	300	295	295	300	270	275	315		
19	305	A	A	270	280	270	300	310	310	325	305	320	310	300	315	315	315	300	305	325	305	265	245	250		
20	255	320	350	255	270	260	280	320	340	355	315	325	330	315	320	310	315	310	320	350	370	235	235	250		
21	260	280	245	A	250	250	295	315	350	330	325	325	325	330	325	325	300	305	335	330	300	270	255	265		
22	250	250	265	285	260	275	295	300	350	335	320	285 <sup>H</sup>	310	315 <sup>H</sup>	310	305	325	315	290	310	300	295	275	265		
23	270	260	255	270	300	305	A	305	320	315 <sup>H</sup>	330	335	300	335	320	320	335	320	310	330	340	325	275	F	280	
24	265	270	260	240	245	250	270	305	320	320	305	325	330	325	305 <sup>H</sup>	345	320	325	275	315	355	280	280	270		
25	260	270	270	255	270	285	295	325	355	330	355	315	340	340	325	350	335	325	310	305	320	320	280	275		
26	265	260	280	305	265	285	270	320	345	345 <sup>H</sup>	320	340	325	340	330	335	330	300	320	345	325	260	A	270		
27	270	275	275	285	305	285	300	345	335	335	350	335	315	320	320	345	330	300	310	300	310	285	270	275		
28	260	290	325	325	285	265	280	330	355	345	350	345	325	310	310	325	330	310	310	305	290	270	265	285		
29	275	265	265	275	305	285	265	300	330	330	305	340	310	315	325	300	330	310	355	310	285	270	295	290		
30	265	240	260	285	A	330	280	315	325	340	340	340	325	315	325	345	335	290	305	335	305	310	295	295		
31	280	285	275	280	270	290	305	320	335	335	330	325	330	325	335	350	330	315	325	340	295	290	290	280		
	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	29	28	29	30	31	31	31	31	31	31	31	30	31	31	31	31	30	31	31	30	31		
MED	268	270	270	280	280	280	290	325	335	330	320	320	315	315	315	315	320	310	310	312	310	285	275	270		
UQ	275	275	280	285	295	285	300	330	348	338	330	332	325	325	325	330	332	315	318	330	330	295	280	282		
LQ	260	260	260	260	262	270	275	310	322	322	312	312	300	305	305	305	315	300	302	300	300	265	265	265		

DEC. 1982

M(3000)F2 (0.01)

# IONOSPHERIC DATA

DEC. 1982

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

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

DEC. 1982

M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9 h)

Station AKITA Lat. 39° 43.5' N Long 140° 08.0' E Sweep 1 MHz to 20 MHz in 20sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1												230	240												
2													230		c										
3																									
4																									
5													265												
6													300												
7																									
8														250											
9																									
10																									
11																									
12												245			250										
13																									
14																									
15																									
16											260														
17																									
18																									
19										255	250														
20														245											
21													A		225		A								
22																									
23														240											
24													240												
25																									
26																									
27														240											
28												280	270												
29													255												
30																									
31												250	230		255	240									
00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT									1	3	4	7	5	3											
MED									255	250	238	255	245	240											
UQ									255	262	268	250	245												
LQ									250	230	240	240	232												

DEC. 1982

H<sup>o</sup>F<sub>2</sub> (KM)

# IONOSPHERIC DATA

DEC. 1982

H·F (KM)

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

Station		AKITA																								
		Lat. 39 43.5 N												Long. 140 08.0 E												
		Sweep 1 MHz to 20 MHz in 20sec 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 345	E S 320	260	245	225	E S 345	E S 290	240	220	235	230	210	215	220	225	225	205	210	210	A	250	E S 240	E S 320	E S 320	
2		E S 320	E S 310	E S 300	260	245	E S 260	E S 275	230	220	230	220	230	210	240		225	225	210	220	215	E S 250	220	E S 350	E S 345	
3		E S 340	E S 345	260	240	255	E S 300	E S 290	230	220	225	230	225	230	245	230	220	215	200	210	250	E S 270	240	E S 320	E S 340	
4		E S 360	E S 350	E S 340	290	260	E S 285	225	230	225	235	230	240	225	220	225	225	225	205	270	250	225	255	E S 330	E S 330	
5		E S 315	E S 330	E S 330	305	315	290	245	230	210	210	245	225	215	240	240	220	220	235	235	225	205	250	E S 280	E S 270	
6		E S 260	E S 300	270	E S 285	240	240	240	225	220	230	225	230	210	240	225	205	220	210	230	225	235	230	E S 275	E S 280	
7		270	300	300	300	275	260	240	210	220	225	225	230	230	225	245	220	220	200	225	225	245	E S 305	E S 400	E S 420	
8		A	E S 400	E S 350	E S 380	E S 360	E S 330	260	245	230	E B 250	250	240	215	225	235	240	230	205	A	235	200	E S 310	E S 330	E S 325	
9		E S 350	E S 350	E S 345	E S 375	E S 400	E S 300	E S 335	260	215	255	200	250	230	225	235	220	210	200	225	220	240	250	E S 350	E S 350	
10		E S 400	E S 340	255	260	240	E S 270	E S 280	240	235	230	230	230	225	235	240	240	210	210	230	275	E S 320	E S 340	E S 275	275	
11		235	255	E S 400	E S 380	E S 375	230	230	210	220	A 245	250	240	240	240	240	230	230	210	A	A	240	240	E S 280	270	
12		260	E S 340	E S 400	E S 370	300	E S 320	245	230	225	240	225		A 250	250		A 235	235	245	225	210	225	E S 265	E S 320	E S 325	
13		290	275	280	285	E S 330	285	250	240	215	210	235	225	220	240	220	225	210	200	225	A	A	270	E S 305	E S 280	
14		E S 310	E S 320	300	285	320	290	230	220	225	225	235	230	225	225	240	240	210	240	225	225	220	E S 240	E S 340	E S 300	
15		E S 310	E S 310	270	250	E S 255	E S 325	255	235	230	230	235	240	240	225	220	245	205	205	E S 255	E S 270	240	E S 270	250	E S 300	
16		E S 300	E S 300	E S 290	E S 280	275	E S 280	240	240	230	210	235	240	240	220	230	250	220	230	225	225	220	E S 325	E S 320	E S 355	
17		E S 350	E S 345	E S 350	E S 330	E S 340	E S 340	E S 310	250	235	245	235	230	220	250	240	240	225	240	245	A	E S 350	E S 350	305	290	
18		E S 270	E A 340	250	260	E S 240	270	E S 345	250	250	210	245	225	220	230	235	220	205	210	260	280	240	275	A	A	220
19		A	A	A	E S 350	E S 300	290	230	240	230	A	A	225	225	220	230	220	205		A	A	230	A	A	E S 400	E S 375
20		A	240	205	E S 305	E S 325	E S 375	E S 340	250	215	220	240	235	240	230	235	210	230	240	230	220	225	E S 415	E S 410	E S 400	
21		E S 340	E S 290	E S 400	A	E A 420	E A 400	E A 275	240	240	230	220	235	A	225	A	A	200	215	240	230	245	E S 310	E S 350	E S 330	
22		E S 360	E S 360	E S 325	270	E S 310	E S 325	260	210	240	225	240	220	240	220	230	230	220	215	255	260	230	220	E S 270	E S 305	
23		E S 320	E S 365	E S 385	E S 350	230	E S 270	A	225	230	220	220	225	210	230	225	220	210	200	240	225	225	235	E S 310	E S 330	
24		A	E S 345	E S 310	E S 375	E S 425	E S 370	E S 275	255	220	240	230	240	230	210	220	210	205	200	E S 270	245	205	E S 290	E S 290	E S 315	
25		E S 310	E S 305	E S 320	E S 370	E S 320	270	E S 285	255	220	230	230	220	225	225	230	220	210	235	205	240	240	225	E S 330	E S 310	
26		E S 355	E S 335	E S 325	260	E S 260	E S 280	E S 300	245	225	210	210	220	240	220	230	220	210	215	235	230	240	E S 285	A	E S 310	
27		E S 345	E S 325	E A 310	270	250	E S 300	E S 275	225	220	210	240	230	220	225	240	215	205	200	230	225	245	E S 275	E A 340	A	
28		A	A	250	240	E S 280	E S 320	E S 270	245	220	220	240	210	225	230	225	235	210	230	215	220	A	260	A	255	
29		E S 325	E S 305	E S 310	280	230	E S 250	E S 280	250	220	220	230	220	225	235	225	210	225	240	210	205	E S 270	E S 305	E A 305	E S 275	
30		E S 330	E S 355	E A 375	A	A	225	E S 320	240	220	235	235	225	225	230	240	225	215	200	235	210	240	255	245	E S 270	
31		E S 300	E S 280	E S 305	E S 305	E S 300	E S 280	245	220	210	240	235	220	210	240	220	205	210	230	240	210	E S 275	E S 270	A	E A 285	
CNT		26	29	30	29	30	31	30	31	31	30	30	30	30	31	28	30	31	30	28	27	28	30	27	30	
MED		E S 320	E S 325	E S 310	U 262	E S 290	E S 290	E E 272	240	220	229	232	230	225	230	230	222	210	210	229	225	232	E S 268	E S 320	E S 310	
UQ		E S 345	E S 345	E S 345	E S 350	E S 325	E S 322	E S 290	245	230	235	240	235	230	240	240	235	222	230	239	240	244	E S 305	E S 335	E S 330	
LQ		E S 300	E S 300	262	260	245	U 248	242	228	220	220	225	225	220	225	225	220	210	200	225	220	225	238	E S 285	E S 280	

DEC. 1982

H·F (KM)

# IONOSPHERIC DATA

DEC. 1982

H°E (KM)

135° E Mean Time (G.M.T. + 9 h)

Station **AKITA** Lat. **39 43.5 N**, Long **140 08.0 E** Sweep 1 MHz to 20 MHz in 20sec 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	115	110	110	110	110	110	110	115	S								
2								S	110	110	110	110	110	110		C	110	S							
3								S	110	110	105	105	A	100	110	115	S								
4								S	A	A	A	A	A		110	110	A	A							
5								S	115	110	110	110	110	110	110	110		A							
6								S	105	110	110	110	105	105	105	105	S								
7								S	120	115	110	110	110	E B	115	110	110	S							
8								S	115	B	B	110	115	105	105	105	A								
9								S	120	115	E B	120	115	115	110	110	120	S							
10								S	120	115	115	110	E B	E B	E B	B	120	S							
11								S	115	115	110	110	110	110		B	110	115							
12								S	120	110	110	110	110	110	110	E B	115	S							
13								S	120	110	110	110	110	105	115	105	S								
14								S	A	110	A	110	110	110		A	A	S							
15								S	120	115	110	110		A	A	110	115	S							
16								S	110	110	110	110	110	105	110	105	S								
17								S	120	110	110	E B	120	110	110	110	110	S							
18								S	115	110	110	110	A	105	A	110	A								
19								S	125	120	120	120	115	115	115	120	S								
20								S	E B	E B	E B	E B	E B	E B	E B	A	A	S							
21								S	A	110	110	110	110	E B	E B	E B	S	S							
22								S	A	A	110	110	110	110	110	E B	125	S							
23								S	110	110	110	A	115	110	115	120	S								
24								S	120	110	110	110	110	110	105	110	S								
25								S	120	110	110	110	110	110	110	110	110								
26								S	S	120	110	105	E B	120	110	A	A	S							
27								S	115	115	110	E B	120	115	E B	125	110	E B	125	S					
28								S	E B	E B	E B	E B	E B	E B	B	E B	120	120	S						
29								S	E B	120	E B	120	B	B	B	I B	120	110	S						
30								S	110	110	110	I B	110	120	120	120	115	S							
31								S	115	110	110	110	110	105	115	115	S								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									26	28	28	28	26	28	24	26	2								
MED									116	110	110	110	110	110	110	111	112								
UQ									120	115	110	110	112	111	114	118									
LQ									115	110	110	110	110	108	110	110									

DEC. 1982

H°E (KM)

# IONOSPHERIC DATA

DEC. 1982

H°ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA																							
Lat. 39 43.5 N, Long 140 08.0 E		Sweep 1 MHz to 20 MHz in 20sec in automatic operation																							
Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	S	S	S	S	S	S	S	S	G	G	G	G	G	G	G	G	100	95	105	105	110	110	105	S	
2	S	100	100	S	S	S	S	S	G	G	G	G	G	160	C	G	95	100	100	S	S	135	S	S	
3	S	S	S	S	S	S	S	S	G	G	150	G	100	135	125	120	125	100	S	145	S	130	110	105	
4	100	100	100	100	S	S	S	G	100	100	100	100	100	G	G	100	100	100	100	95	S	S	110	115	
5	110	S	S	S	S	S	S	S	135	G	125	120	120	125	G	G	100	100	100	100	S	110	S	S	
6	S	105	100	110	100	S	S	S	G	G	G	G	G	G	G	G	100	100	105	S	S	S	S	105	
7	S	100	105	100	100	100	100	S	G	115	115	115	115	115	G	110	S	105	100	S	110	100	100	S	
8	110	105	105	110	110	S	S	110	130	B	120	120	120	110	G	G	100	100	100	100	120	S	S	S	
9	S	S	100	S	S	S	S	135	125	115	G	120	120	110	110	140	S	110	110	100	100	100	S	S	
10	110	110	105	105	100	S	S	S	G	125	115	115	120	115	B	G	G	115	105	100	S	100	S	S	
11	S	S	S	S	S	S	S	S	145	120	115	110	110	110	110	110	G	S	115	110	110	S	110	110	
12	S	S	S	100	110	110	110	S	G	G	G	120	110	115	110	110	100	100	S	S	115	110	100	95	
13	100	105	105	105	100	S	S	110	G	G	125	125	125	120	115	G	G	S	95	95	95	100	S	S	
14	100	100	110	S	S	100	S	S	105	120	105	G	125	120	105	100	110	100	100	S	110	S	S	S	
15	S	S	S	100	100	110	S	S	G	100	G	G	105	105	115	G	S	100	100	100	95	S	105	100	
16	105	105	105	105	S	S	S	S	G	G	130	110	110	G	110	G	100	100	100	100	100	S	120	110	
17	S	S	110	110	110	S	S	110	G	110	G	125	110	120	110	G	130	100	100	110	105	100	105	140	
18	135	110	S	S	S	S	S	S	140	120	115	115	130	120	100	G	105	100	115	100	110	105	105	105	
19	110	115	110	110	110	S	S	S	130	120	120	120	115	120	120	120	S	105	100	100	100	95	100	110	
20	115	110	110	S	110	110	105	S	G	125	G	G	120	110	105	105	105	95	100	100	100	100	100	100	
21	S	S	S	110	110	110	105	105	105	135	125	120	115	120	115	110	135	105	105	100	100	110	100	S	
22	S	S	110	105	150	105	110	105	105	105	130	G	140	145	120	150	115	120	105	100	100	100	100	100	
23	S	S	110	105	105	105	100	110	G	G	G	100	115	120	125	G	G	S	100	S	S	105	S	S	
24	110	110	S	S	S	S	S	S	G	135	120	120	110	G	G	G	100	S	S	S	S	S	S	S	
25	S	S	100	100	105	105	S	S	G	G	120	G	G	120	115	110	G	100	S	S	S	S	S	S	
26	S	S	S	105	S	105	100	100	G	G	125	130	G	100	100	100	100	100	105	105	105	105	100	S	
27	100	100	100	100	100	105	S	S	155	G	125	130	120	125	125	120	S	S	S	S	120	105	100	100	
28	105	100	100	S	S	110	S	S	155	140	135	135	125	B	G	G	S	100	S	S	100	105	105	110	
29	125	S	S	110	S	S	S	S	125	125	120	B	B	B	B	G	100	S	S	100	100	100	95	S	
30	S	120	105	100	100	105	S	S	120	120	G	B	G	G	G	G	125	105	105	S	105	105	S	S	
31	S	S	S	105	S	S	S	S	G	G	G	G	120	G	G	G	S	S	S	S	S	S	100	100	
CNT	14	16	19	20	16	13	7	8	14	17	20	19	24	22	18	14	18	24	23	20	20	21	20	15	
MED	110	105	105	105	105	105	105	110	128	120	120	120	118	120	112	110	100	100	100	100	102	105	102	105	
UQ	110	110	110	110	110	110	108	110	140	125	125	122	120	120	120	120	110	105	105	105	110	110	105	110	
LQ	100	100	100	100	100	105	100	105	105	115	115	115	110	110	110	105	100	100	100	100	100	100	100	100	

DEC. 1982

H°ES (KM)

# IONOSPHERIC DATA

DEC. 1982      TYPES OF ES

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

Station **AKITA**      Lat. **39 43.5 N**      Long **140 08.0 E**      Sweep **1** MHz to **20** MHz in **20** 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																	L1	F1	F1	F4	F2	F1	F1		
2		F1	F1											H1			L2	F1	F1			F1			
3											H1		LH21	H1	C2	CH12	C1	F1		F1		F1	F2	F2	
4	F3	F2	F2	F1					L4	L3	L2	L2	L2			L2	L3	F1	F2	F2			F1	F2	
5	F2								H1		C2	C2	C1	C1			L2	F3	F2	F1		F2			
6		F1	F2	F1	F1												L1	F1	F1					F2	
7		F2	F2	F2	F2	F1	F2			C1	C1	C1	C1	C1		C1		F1	F1		F2	F3	F2		
8	F3	F3	F2	F2	F1					C1	C1	C1	C1	C1			L1	F1	F3	F2	F1				
9			F1						H2	C2	C3		C1	C2	C2	C1	H1		F1	F2	F3	F1	F1		
10	F2	F2	F2	F2	F1					C1	C2	C4	C1	C2				F1	F2	F1		F1			
11									H1	C2	C1	C2	C1	C2	C1	C2			F6	F6	F1		F2	F2	
12				F2	F2	F1	F1					C4	C3	C3	C3	C6	L4	F4			F1	F2	F1	F1	
13	F1	F1	F1	F1	F1					C1	C1	C1	C1	C1	C1				F2	F3	F3	F2			
14	F1	F1	F1			F1			L2	C2	L1		C1	C2	L2	L2	C2	F1	F4		F1				
15				F1	F1	F1				L1			L2	L2	C1			F1	F3	F1	F1		F2	F2	
16	F2	F2	F2	F2							C1	C2	C1		C2		L2	F2	F1	F1	F2		F1	F2	
17			F2	F2	F2					C1		C1	C2	C1	C1		CL12	F3	F1	F4	F2	F2	F2	F3	
18	F1	F3							H1	C1	C1	C1	CL12	C1	L2		L2	F1	F2	F2	F3	F2	F6	F1	
19	F4	F5	F6	F2	F2				C2	C2	C4	C2	C2	C1	C1	C2		F3	F4	F3	F4	F3	F1	F2	
20	F4	F2	F1		F1	F1	F1			C1			C1	C1	L1	L1	L1	F2	F3	F3	F2	F2	F1	F1	
21				F5	F2	F3	F2	L2	L1	H1	C1	C2	C3	C3	C2	C4	HL12	F2	F2	F2	F2	F1	F1		
22			F2	F2	F1	F1	F2	L3	L2	L2	C1		H1	H2	C1	HC12	C1	F1	F2	F3	F2	F1	F1	F1	
23			F2	F3	F3	F2	F5	C1				L1	C1	C1	C1				F1			F1			
24	F3	F2								H1	C1	C1	C1				L1								
25			F2	F1	F1	F1					C1			C1	C1	C3		F2							
26				F1		F1	F2	L2			C1	C1		L1	LH11	L1	L1	F1	F2	F1	F2	F1	F3		
27	F1	F1	F2	F2	F1	F2			H1		C1	C1	C1	C1	C2	C2					F1	F1	F2	F3	
28	F3	F1	F1			F1			H1	H1	H1	H1	C1					F1			F2	F2	F3	F1	
29	F1			F1					C1	C1	C2						L1			F2	F1	F1	F2		
30		F1	F3	F4	F3	F1			C1	C1								F1	F2	F1		F2	F1		
31				F1									C1										F3	F2	
	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																									

DEC. 1982      TYPES OF ES



# IONOSPHERIC DATA

DEC. 1982

FXI (0.1 MHz)

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

Station		KOKUBUNJI TOKYO										Lat. 35 42.4 N		Long 139 29.3 E		Sweep 1 MHz to 20 MHz in 20sec 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 43	S 45	X 55	X 45	X 36	X 32	X 37											X 67	X 62	S 51	X 48	S 40	X 35	X 38	
2	X 38	X 39	X 39	X 41	X 39	X 33	X 39											X 84	X 78	X 48	X 50	S 49	X 38	X 36	
3	X 37	X 37	X 44	X 41	X 30	X 30	X 36											X 67	X 55	S 52	S 55	X 55	X 41	X 41	
4	S 41	S 40	X 42	S 45	X 42	X 41	S 45											X 68	X 55	X 56	X 56	X 50	X 45	X 41	
5	S 41	X 41	X 40	X 40	X 39	X 40	X 46											X 82	X 76	X 67	X 53	X 43	X 41	X 42	
6	S 41	X 41	X 43	X 41	S 44	S 43	S 46											X 74	S 62	X 63	X 57	X 48	X 40	X 42	
7	S 46	S	S 48	S 51	S 52	S 49	X 54											X 97	X 75	X 60	X 58	S 50	X 45	S 44	
8	S 42	S 42	S 44	X 41	X 44	X 41	X 51											102	X 68	X 83	X 59	X 41	X 44	X 45	
9	X 43	X 44	X 44	X 43	X 43	S 47	S 50											S 95	X 69	X 61	X 54	53	X 49	X 48	
10	X 45	X 47	X 55	X 39	X 35	X 32	X 37											X 88	X 82	S 76	X 70	X 71	X 70	S 72	
11	X 67	X 56	X 51	S	X 55	X 64	X 49											X 91	X 79	X 64	X 66	X 56	X 54	X 52	
12	S 44	X 41	X 39	X 40	X 41	X 40	X 43											S 105	X 101	S 93	S 81	S 67	S 61	X 56	
13	X 55	X 51	X 42	X 37	X 36	X 36	X 41											X 76	X 69	X 55	X 48	X 41	X 40	X 41	
14	X 40	S 42	X 47	S 47	X 45	X 47	X 50											S 93	X 87	X 68	X 65	X 58	X 45	S 45	
15	X 45	X 46	X 48	S 44	X 32	X 30	X 38											X 76	X 60	X 62	X 66	X 47	X 45	S 45	
16	X 44	S 43	X 43	X 46	X 41	X 40	X 47											X 98	X 91	X 78	X 61	H 40	X 41	X 41	
17	X 39	X 40	X 39	X 38	X 37	X 38	X 41											108	100	X 90	X 64	X 66	X 68	X 69	
18	X 69	S 75	S 83	X 73	X 70	X 70	S 60											X 89	X 88	S 94	107	X 88	X 88	S 76	
19	S 70	S	S 51	S 53	X 53	X 58	X 68											A	X 81	S 81	X 66	S	X 49	S 52	
20	X 55	X 64	A	S 30	X 31	X 28	X 33											S 100	X 91	X 79	S 46	X 40	X 41	X 41	
21	X 42	X 40	X 29	X 32	X 33	X 31	X 36											X 73	X 75	S 71	X 59	X 41	X 42	S 46	
22	X 43	X 44	X 47	X 50	X 41	X 41	X 38											C	C	C	C	C	C	C	
23	C	C	C	C	C	C	C											S 78	X 61	X 61	X 54	S 49	X 41	S	
24	S 42	S 40	X 38	X 33	X 33	X 35	S 43											X 71	X 45	X 60	X 64	X 38	X 38	X 37	
25	S 38	X 39	X 38	X 38	X 39	X 41	X 42											X 72	X 72	X 57	X 61	X 60	X 40	X 37	
26	X 37	X 38	X 38	X 40	X 35	X 36	X 37											X 75	X 68	X 64	X 51	X 43	X 40	X 43	
27	S 41	S 41	S 42	X 43	X 40	X 39	X 41											X 83	X 77	S 72	X 56	X 48	S 46	S 43	
28	X 44	X 50	X 53	X 38	X 36	X 36	X 38											X 77	X 69	X 59	X 52	X 46	X 49	X 45	
29	S 44	S 47	X 45	X 47	S 45	X 43	X 39											S 97	X 98	X 73	X 46	S 45	X 45	S 43	
30	X 34	X 35	X 35	X 40	X 39	X 32	X 32											X 79	X 71	X 72	X 46	X 41	X 37	X 38	
31	X 36	X 38	X 38	X 37	S 39	X 40	S 41											X 73	S 77	S 79	X 46	X 41	X 41	X 40	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	28	29	29	30	30	30											29	30	30	30	29	30	29	
MED	X 42	X 42	X 43	X 41	X 39	X 40	X 41											X 82	X 75	X 66	X 56	X 48	X 43	X 43	
UQ	X 45	X 46	X 48	X 45	X 44	X 43	X 47											X 95	X 82	X 78	X 64	X 55	X 49	X 46	
LQ	X 40	X 40	X 39	X 38	X 36	X 33	X 38											X 74	X 68	X 60	X 51	X 41	X 40	X 41	

DEC. 1982

FXI (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOF2 (0.1 MHz)

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

Station: **RKUBUNJI TOKYO** Lat. **35 42.4 N** Long **139 29.3 E** Sweep 1 MHz to 20 MHz in 20sec 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	37	39	49	39	30	26	31	73 <sup>S</sup>	104	112	121	112	105	107	104	103 <sup>C</sup>	89 <sup>C</sup>	61	56	45 <sup>S</sup>	42 <sup>S</sup>	34 <sup>S</sup>	29	32
2	32	33	33	35	33	27	33	75 <sup>S</sup>	95 <sup>S</sup>	102	106	98	102	95	99 <sup>S</sup>	91	93	78 <sup>S</sup>	72	42	44	43 <sup>S</sup>	32	30
3	31	31	38	35	24	24	30	74 <sup>S</sup>	96 <sup>S</sup>	107 <sup>S</sup>	103	98 <sup>S</sup>	101	114	104	86	92	61 <sup>S</sup>	49	46	49 <sup>S</sup>	49	35 <sup>S</sup>	35 <sup>S</sup>
4	35	34 <sup>S</sup>	36	39 <sup>S</sup>	36	35	39 <sup>S</sup>	70	109	105 <sup>S</sup>	115	129	125	114	103	105	94	62	49	50	50	44	39 <sup>S</sup>	35
5	35 <sup>S</sup>	35	34	34	33	34	40 <sup>S</sup>	81 <sup>S</sup>	93	99 <sup>S</sup>	118	131	114	119	118	114	89	76 <sup>S</sup>	70	61	47	37	35	36
6	35	35	37	35	38 <sup>S</sup>	37 <sup>S</sup>	40	76 <sup>J</sup>	85	106	121	117	114	115	104	98 <sup>S</sup>	87	68	56	57	51	42 <sup>S</sup>	34	36
7	40	42 <sup>I</sup>	42 <sup>S</sup>	45 <sup>S</sup>	46 <sup>S</sup>	43	48	85	87	99	103	124	126	119	124	116	99	91	69	54	52	44 <sup>S</sup>	39	38 <sup>S</sup>
8	36	36	38	35	38	35	45	68	115	111 <sup>I</sup>	144	148	130	121	121	114	104	96	62 <sup>S</sup>	77	53	35	38	39
9	37	38	38	37	37	41 <sup>S</sup>	44 <sup>S</sup>	93	138	148	155	147	151	149	144	139	113	89	62	55	48	46 <sup>F</sup>	43	42
10	39	41 <sup>S</sup>	49	33	29	26	31	75 <sup>S</sup>	100	137	131	135 <sup>H</sup>	139 <sup>R</sup>	133	119	127	111	82 <sup>J</sup>	76 <sup>S</sup>	70 <sup>S</sup>	64	65	64	66 <sup>S</sup>
11	61 <sup>S</sup>	50	45	46 <sup>I</sup>	49	58 <sup>S</sup>	43	78 <sup>S</sup>	82	113	135	139	135	130	125	106	96 <sup>S</sup>	85	73 <sup>S</sup>	58	60	50	48	46
12	38 <sup>S</sup>	35 <sup>F</sup>	33	34 <sup>F</sup>	35	34 <sup>F</sup>	37 <sup>S</sup>	75 <sup>J</sup>	100	142	158 <sup>J</sup>	132	135	135	131	131	120	99 <sup>S</sup>	95 <sup>S</sup>	87	75 <sup>S</sup>	61 <sup>S</sup>	55	50
13	49	45 <sup>S</sup>	36	31	30	30	35	78 <sup>S</sup>	111	116	128	132	123	111	106	104 <sup>S</sup>	86	70	63	49	42	35	34 <sup>S</sup>	35
14	34 <sup>S</sup>	36	F	41 <sup>S</sup>	F	F	44	82 <sup>S</sup>	98 <sup>S</sup>	111	124	123	122	119	112	116	113	87	81	62	59	52 <sup>S</sup>	39	39 <sup>S</sup>
15	39	40	42 <sup>S</sup>	38 <sup>S</sup>	26	24	32	74 <sup>S</sup>	94 <sup>S</sup>	113	127	125	124	115	124	102	98	70	54	56	60	41	39	39
16	38	37 <sup>S</sup>	37	40	35	34	41	76 <sup>S</sup>	100 <sup>S</sup>	115	120	135	134	124	119	120	109 <sup>S</sup>	92	85	72 <sup>S</sup>	55	34 <sup>H</sup>	35	35
17	33	34	33	32	31	32	35	78 <sup>S</sup>	114	151	146 <sup>S</sup>	145	141	140	135	124 <sup>S</sup>	117	102 <sup>S</sup>	94 <sup>S</sup>	84	58	60	62	63
18	63 <sup>S</sup>	69	77 <sup>S</sup>	67	64	64	54 <sup>S</sup>	109	130	152	141	140	120	122	122	109	98	83	82	88 <sup>S</sup>	101 <sup>S</sup>	82 <sup>S</sup>	82	70
19	64 <sup>S</sup>	A	45 <sup>S</sup>	47 <sup>S</sup>	47	52	62	97 <sup>S</sup>	118	152 <sup>S</sup>	158	155	147	140	124	110	98 <sup>S</sup>	A	75 <sup>S</sup>	75 <sup>J</sup>	60	A	43	46 <sup>S</sup>
20	49	58	A	24 <sup>S</sup>	25	22	27	79	116	124	130	139	132	115	114	118	97 <sup>S</sup>	94	85	73	40 <sup>S</sup>	34	35	35
21	36	34	23	26	27	25	30	69	105	138	140	125	135	134	117	109	92	67	69	65 <sup>S</sup>	53	35	36	40 <sup>S</sup>
22	37	38	41	44	35	35	32	64	95	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	114 <sup>J</sup>	120 <sup>S</sup>	130 <sup>S</sup>	123	101	112	104	95 <sup>S</sup>	72	55	55	48	43 <sup>S</sup>	35	S
24	36 <sup>S</sup>	34 <sup>S</sup>	32	27	27	29	37 <sup>S</sup>	66 <sup>S</sup>	105	118	145	150 <sup>S</sup>	145	125	114	107	85	65	39	54	58	32	32	31
25	32	33	32	32	33	35	36	68 <sup>S</sup>	99 <sup>S</sup>	106	131	110	122	103	108	111	88	66	66	51	55	54 <sup>S</sup>	34	31
26	31	32	32	34	29	30	31	70	107	130	102 <sup>R</sup>	105	120	113	109	99 <sup>S</sup>	85	69	62 <sup>S</sup>	58	45	37	34	37
27	35	35	36	37 <sup>S</sup>	34	33	35	67	83	98 <sup>S</sup>	119	131 <sup>H</sup>	109	109	108	118	93	77 <sup>S</sup>	71	66 <sup>S</sup>	50	42 <sup>S</sup>	40 <sup>S</sup>	37 <sup>S</sup>
28	38	44	47	32	30	30	32	65	96 <sup>S</sup>	100	118	108	101	98	106	109	93	71	63 <sup>S</sup>	53	46 <sup>S</sup>	40	43	39
29	38 <sup>S</sup>	41 <sup>S</sup>	39	41	39	37	33	61 <sup>S</sup>	114	122	120	130	116	139	125	106	91	91	92	67	40 <sup>S</sup>	39	39	37
30	28	29	29	34	33	26	26	63 <sup>S</sup>	88	115	124	96	104	104	106	106	85	73 <sup>S</sup>	65 <sup>S</sup>	66	40 <sup>S</sup>	35	31	32
31	30	32	32	31	33 <sup>S</sup>	34	35 <sup>S</sup>	61 <sup>S</sup>	74 <sup>S</sup>	101 <sup>S</sup>	129	130	123	114	125	93 <sup>S</sup>	66	67	71 <sup>S</sup>	73 <sup>S</sup>	40 <sup>S</sup>	35	35	34
CNT	30	29	28	30	29	29	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	29	30	29
MED	36	36	37	35	33	34	35	74 <sup>S</sup>	100	114	126	130	123	117	116	109	94	76	69	60	50	42	37	37
UQ	39	41	42	40	37	35	41	78 <sup>S</sup>	111	130	140	139	135	130	124	116	99	89	76	72	58	49 <sup>S</sup>	43	40 <sup>S</sup>
LQ	34	34	33	32	30	27	32	68 <sup>S</sup>	94 <sup>S</sup>	106	119	117	114	111	106	104	89	68	62	54	45	35	34	35

DEC. 1982

FOF2 (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOF1 (0.01 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station		R0KUBUNJI TOKYO		Lat. 35° 42' 4" N		Long 139° 29' 3" E		Sweep 1		MHz to 20		MHz in 20		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										
2												L	L	L	L										
3											L	L	A	L	L										
4												L	L	L	L										
5												L		L	L	L									
6											L	L	L		L										
7												L		L											
8											C	L		L											
9												A	L	L	L	L									
10											L				L										
11												L	L		A										
12											L				A	A									
13												L													
14													L												
15													B			L	L								
16											L	L	L	L											
17											L			L	L										
18												L		L	L										
19												A	A	L	L		A								
20														A											
21											L			L	A	A									
22											C	C	C	C	C	C	C								
23													L												
24												L	L	L	L	L									
25												L		L	L										
26														L	L										
27												L		L	L										
28												L	L	L		L									
29															L	L									
30														L											
31												L	L		L	L									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																									
MED																									
UQ																									
LQ																									

DEC. 1982

FOF1 (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1982

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 20 MHz in 20sec 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								170	A	310	325	345	A	335	305	C	185							
2								165	H	260	300	A	345	A	340	310	270	S						
3								S	260	310	335	350	355	340	A	280	170							
4								S	265	H	310	335	A	H	355	A	300	280	A					
5								S	A	A	A	A	355	355	350	A	275	175						
6								H	200	280	A	A	A	360	A	320	275	A						
7								180	270	310	340	A	A	350	A	A	A							
8								H	185	265	C	360	A	A	360	320	270	S						
9								175	270	315	335	A	355	A	A	A	190							
10								180	275	320	350	360	B	350	B	A	210							
11								S	260	310	335	A	A	A	A	A	A							
12								A	250	310	345	A	A	A	A	A	A							
13								A	A	310	330	345	360	355	A	A	A							
14								S	265	315	340	A	A	345	A	280	A							
15								S	270	305	A	B	360	340	310	A	A							
16								S	270	310	345	A	350	340	A	H	260	185	J	K				
17								S	H	265	310	A	A	A	A	A	A	A						
18								180	265	H	310	A	A	A	345	A	A	A						
19								H	180	265	H	305	A	A	A	A	A	A						
20								A	A	A	A	A	A	A	A	A	A							
21								S	220	290	330	340	350	A	A	A	A							
22								S	H	250	C	C	C	C	C	C	C	C						
23								C	C	290	315	H	340	A	R	305	270	190						
24								S	240	H	285	H	300	330	335	320	290	260	A					
25								S	H	260	295	A	350	350	335	A	270	A						
26								S	240	280	A	A	350	340	305	A	A							
27								C	C	290	320	335	340	330	305	270	200							
28								S	H	240	B	A	350	350	A	310	A	A						
29								S	H	240	290	A	A	345	340	300	H	260	210					
30								S	A	A	325	B	345	340	310	270	205							
31								S	240	290	320	335	340	325	305	265	190							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								9	24	24	19	13	17	19	14	15	11	1						
MED								180	262	310	335	345	350	340	305	270	190	J	K					
UQ								180	268	310	340	350	355	348	310	275	202							
LQ								175	245	290	325	340	345	338	305	268	185							

DEC. 1982

FOE (0.01 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOES (0.1 MHz)

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

Station		ROKUBUNJI TOKYO												Lat. 35 42.4 N		Long 139 29.3 E		Sweep 1 MHz to 20 MHz in 20sec in automatic operation																	
Hour	Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23										
1		E 16	S 15	E 15	E 13	E 13	E 15	E 15	19	28	33	37	40	38	G 28	G 40	E 21	25	23	20	E 16	22	22	26											
2		20	E 13	E 15	E 15	E 13	E 13	E 15	G	G	G	35	G	36	G	G	E 16	24	J A 26	J A 18	J A 42	J A 34	J A 20	20											
3		21	E 13	E 13	E 13	E 14	E 15	22	E 16	G 18	33	36	43	44	39	70	30	19	26	23	19	21	J A 32	J A 28	17										
4		J A 21	J A 22	E 13	21	24	25	E 14	21	G 18	33	37	39	37	35	G 27	33	23	20	18	J S 15	E 16	23	E 16	22										
5		17	J A 25	22	22	E 12	E 15	21	J A 20	J A 27	32	39	44	41	G 26	33	G 21	G	J A 29	J A 27	23	E 16	J A 20	19	26										
6		J A 27	21	18	22	23	21	E 15	G	G	33	36	35	G	37	G 25	J A 30	28	21	21	19	17	17	E 16	E 16										
7		E 16	J A 24	25	E 15	E 15	J A 23	E 16	G	G	G	39	J A 53	J A 43	G 34	J A 41	J A 46	46	35	J A 29	24	J A 22	18	21	21										
8		22	22	J A 20	20	20	J A 18	21	G	31	C	46	42	39	G	35	G 23	24	J A 29	J A 24	23	J A 50	E 14	23	22										
9		J A 25	21	E 15	E 15	E 15	E 15	21	G	32	35	J A 48	J A 47	39	39	J A 51	J A 46	24	J A 31	J A 40	20	J A 20	22	21	E 15										
10		J A 19	J A 25	J A 22	J A 21	E 15	J A 20	E 15	G	G	34	38	44	J A 78	41	50	39	19	E 15	J A 20	J A 22	J A 30	24	J A 29	J A 22										
11		22	22	E 14	E 16	E 14	E 15	E 15	J A 20	G	40	38	J A 51	51	J A 62	43	J A 44	J A 29	J A 22	J A 25	J A 22	J A 24	J A 52	36	J A 24										
12		J A 28	J A 21	J A 23	J A 26	J A 37	J A 21	21	20	G 16	36	J A 40	J A 49	66	85	81	60	49	J A 20	22	E 16	E 16	J A 24	E 15	J A 22										
13		J A 23	J A 18	J A 22	23	23	23	25	J A 29	J A 34	G 18	35	38	19	39	J A 46	29	23	J A 25	J A 23	22	J A 27	E 15	E 16	22										
14		E 16	E 14	E 15	24	E 15	E 15	23	E 16	28	29	G 32	36	43	J A 50	36	J A 39	J A 22	J A 22	24	J A 20	23	20	J A 29	E 16										
15		E 16	E 15	E 15	E 13	E 14	J A 20	E 15	20	G	G	33	E 80	G 35	G 25	35	43	52	J A 26	29	24	E 15	E 16	32	27										
16		J A 23	E 16	18	E 15	22	E 15	E 16	E 16	G 16	G	G	36	32	35	35	G 20	J A 22	22	23	J A 25	E 16	22	E 15	E 15										
17		E 15	J A 22	E 15	E 13	J A 31	22	E 15	E 16	G 21	G 28	35	39	35	J A 41	35	60	J A 113	J A 54	J A 41	J A 40	J A 21	J A 65	J A 30	22										
18		21	26	22	E 15	18	E 16	22	20	30	34	36	50	35	G 29	J A 55	J A 52	J A 54	J A 81	J A 52	J A 32	J A 51	J A 53	J A 29	J A 89										
19		J A 63	J A 51	J A 54	J A 53	35	E 16	E 14	23	30	J A 54	95	J A 157	J A 48	59	35	J A 63	J A 89	J A 144	J A 40	J A 28	J A 30	42	J A 30	23										
20		21	J A 53	60	J A 32	28	J A 24	J A 26	J A 22	27	31	35	35	J A 46	J A 57	65	63	J A 35	J A 29	J A 27	J A 23	J A 22	J A 22	22	22										
21		21	20	E 15	21	25	19	J A 18	20	G 21	G 25	44	39	40	J A 77	69	28	24	J A 22	17	J A 27	J A 27	J A 20	20	E 16										
22		J A 22	J A 25	23	J A 19	E 14	E 15	E 15	E 15	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C									
23		C	C	C	C	C	C	C	C	C	G	G	36	39	G 26	G 23	29	18	J A 21	23	E 16	22	E 15	E 16	23										
24		19	J A 20	19	E 13	E 14	E 15	E 15	E 15	G	31	33	35	G	35	30	24	25	J A 21	J A 20	J A 26	J A 84	J A 23	J A 21	23										
25		E 16	22	J A 21	J A 18	J A 22	21	22	21	G	33	36	G	G	G	33	G 20	21	E 17	E 17	E 17	E 17	E 17	19	35										
26		J A 22	E 14	E 16	E 13	J A 22	21	E 17	E 17	G	G	33	36	39	38	37	J A 42	31	J A 32	E 17	J A 30	E 17	E 17	E 17	J A 22										
27		J A 52	J A 31	J A 26	J A 22	J A 18	J A 22	J A 23	E 18	E 26	G	40	39	J A 53	J A 39	35	G	23	J A 29	J A 28	J A 22	J A 23	J A 19	21	E 16										
28		E 16	J A 44	J A 23	24	E 13	E 13	E 13	E 16	G	33	38	34	G 32	46	G 26	J A 48	J A 34	J A 30	22	E 15	E 16	J A 25	J A 31	J A 32										
29		23	J A 33	J A 26	J A 25	J A 30	28	22	J A 21	G	G	35	40	G	G	G 24	G	G	J A 18	E 16	E 15	19	E 16	E 16	E 15										
30		E 16	E 15	E 15	E 14	E 13	E 14	E 14	E 14	36	J A 33	35	E 46	G 31	G 32	G 26	G	G	J A 29	J A 21	25	22	20	E 15	E 15										
31		E 15	E 15	J A 22	23	E 15	18	21	24	G	30	33	G	G	G	G	G	G	21	22	22	19	23	24	23										
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23										
CNT		30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30										
MED		21	22	20	20	16	18	E 16	18	G 16	31	36	39	38	36	35	31	24	J A 25	23	22	22	22	21	22										
UQ		J A 23	J A 25	J A 23	23	23	21	22	20	28	33	39	45	43	41	46	J A 46	34	J A 29	J A 27	J A 25	J A 27	J A 24	29	23										
LQ		E 16	E 15	E 15	E 15	E 14	E 15	E 15	E 15	G	G	35	36	G 32	G 26	G 27	G 21	19	J A 21	21	19	E 17	E 16	E 16	16										

DEC. 1982

FOES (0.1 MHz)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1982

FBES (0.1 MHZ)

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

Station: **R**OKUBUNJI **T**OKYO Lat. 35 42.4 N Long 139 29.3 E Sweep 1 MHz to 20 MHz in 20sec 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 <sub>16</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E B <sub>13</sub>	E B <sub>13</sub>	E S <sub>15</sub>	E S <sub>15</sub>	G	28	32	35	37	35	27	G	E C <sub>40</sub>	17	E	E	18	E S <sub>16</sub>	E	E	E		
2	E	E B <sub>13</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E B <sub>13</sub>	E B <sub>13</sub>	E S <sub>15</sub>	G	G	G	34	G	35	G	33	G	E S <sub>16</sub>	E	21	17	22	27	E	E		
3	E	E B <sub>13</sub>	E B <sub>13</sub>	E B <sub>13</sub>	E S <sub>14</sub>	E S <sub>15</sub>	E	E S <sub>16</sub>	G	G	G	43	42	37	31	G	G	E	E	E	E	E	28	E		
4	17	E	E B <sub>13</sub>	E	E	E	E S <sub>14</sub>	G	G	G	37	37	37	34	G	25	23	18	17	S	E S <sub>16</sub>	E	E S <sub>16</sub>	E		
5	E	16	E	E	E B <sub>12</sub>	E S <sub>15</sub>	E	G	27	32	38	37	38	25	G	32	21	G	18	17	E	E S <sub>16</sub>	E	E	E	
6	22	E	E	E	E	E	E S <sub>15</sub>	G	G	32	35	35	G	35	G	23	25	21	E	E	E	E	E	E S <sub>16</sub>	E S <sub>16</sub>	
7	E S <sub>16</sub>	E	15	E S <sub>15</sub>	E S <sub>15</sub>	E	E S <sub>16</sub>	G	G	G	37	40	40	33	32	28	37	32	17	17	E	E	E	E	E	
8	E	E	14	E	E	E	E	G	30	C	43	39	39	G	29	20	17	25	19	E	43	E S <sub>14</sub>	E	E	E	
9	17	E	E S <sub>15</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E	G	31	34	46	42	37	37	36	42	24	31	35	E	E	E	E	E S <sub>15</sub>	E	
10	E	E	16	E	E S <sub>15</sub>	E	E S <sub>15</sub>	G	G	G	37	40	43	37	49	32	17	E S <sub>15</sub>	E	E	20	E	19	18	E	
11	E	E	E S <sub>14</sub>	E S <sub>16</sub>	E S <sub>14</sub>	E S <sub>15</sub>	E S <sub>15</sub>	G	G	40	36	47	43	60	43	36	29	17	24	18	16	18	E	20	E	
12	20	17	16	19	21	E	E	16	G	16	35	36	43	52	71	74	47	41	E	E	E S <sub>16</sub>	E S <sub>16</sub>	20	E S <sub>15</sub>	20	
13	19	15	15	E	E	E	E	21	27	18	G	36	19	39	43	29	20	21	19	E	17	E S <sub>15</sub>	E S <sub>16</sub>	E	E	
14	E S <sub>16</sub>	E S <sub>14</sub>	E S <sub>15</sub>	E	E S <sub>15</sub>	E S <sub>15</sub>	E	E S <sub>16</sub>	28	G	30	36	40	37	34	25	18	E	16	17	16	E	E	E S <sub>16</sub>	E	
15	E S <sub>16</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E B <sub>13</sub>	E S <sub>14</sub>	E	E S <sub>15</sub>	19	G	G	33	E B <sub>80</sub>	G	G	25	29	31	26	18	20	E	E S <sub>15</sub>	E S <sub>16</sub>	E	E	
16	E	E S <sub>16</sub>	E	E S <sub>15</sub>	E	E S <sub>15</sub>	E S <sub>16</sub>	E S <sub>16</sub>	16	G	G	36	32	33	35	19	G	17	S	E	19	E S <sub>16</sub>	16	E S <sub>15</sub>	E S <sub>15</sub>	
17	E S <sub>15</sub>	E	E S <sub>15</sub>	E B <sub>13</sub>	E	E	E S <sub>15</sub>	E S <sub>16</sub>	G	G	21	25	34	38	35	39	34	40	77	19	34	40	E	19	17	E
18	E	E	E	E S <sub>15</sub>	E	E S <sub>16</sub>	E	16	30	G	35	35	35	29	40	40	37	44	24	23	19	28	24	21	E	
19	37	A A <sub>51</sub>	25	23	E	E S <sub>16</sub>	E S <sub>14</sub>	22	28	51	69	81	37	35	34	52	78	A A <sub>144</sub>	25	18	22	A A <sub>42</sub>	20	E	E	
20	E	27	A A <sub>60</sub>	20	15	E	E	19	27	31	34	35	42	49	33	30	33	25	25	19	17	18	E	E	E	
21	E	E	E S <sub>15</sub>	E	E	17	17	18	G	G	20	25	40	36	39	62	46	28	23	E	E	24	19	17	E S <sub>16</sub>	E
22	E	18	E	E	E S <sub>14</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E S <sub>15</sub>	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	G	G	36	37	26	G	23	29	G	E	E	E S <sub>16</sub>	E	E S <sub>15</sub>	E S <sub>16</sub>	E	
24	E	E	E	E B <sub>13</sub>	E S <sub>14</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E S <sub>15</sub>	G	31	32	G	G	G	G	G	24	22	E	18	21	17	E	E	E	
25	E S <sub>16</sub>	E	E	E	E	E	E	G	G	G	33	34	G	G	G	32	G	G	20	E	E S <sub>17</sub>	E S <sub>17</sub>	E S <sub>17</sub>	E S <sub>17</sub>	E	E
26	E	E S <sub>14</sub>	E S <sub>16</sub>	E B <sub>13</sub>	16	E	E S <sub>17</sub>	E S <sub>17</sub>	G	G	33	35	37	36	37	30	30	19	E S <sub>17</sub>	E	E S <sub>17</sub>	E S <sub>17</sub>	E S <sub>17</sub>	E S <sub>17</sub>	E	
27	23	24	25	E	16	18	E	E C <sub>18</sub>	E C <sub>26</sub>	G	37	37	36	G	32	G	18	26	22	16	17	E	E	E S <sub>16</sub>	E	
28	E S <sub>16</sub>	20	E	15	E B <sub>13</sub>	E B <sub>13</sub>	E B <sub>13</sub>	E S <sub>16</sub>	G	33	34	33	32	38	24	39	22	16	E	E S <sub>15</sub>	E S <sub>16</sub>	E	17	18	E	
29	E	21	21	18	21	18	E	G	G	G	32	35	G	G	G	23	G	G	15	E S <sub>16</sub>	E S <sub>15</sub>	E	E S <sub>16</sub>	E S <sub>15</sub>	E S <sub>15</sub>	
30	E S <sub>16</sub>	E S <sub>15</sub>	E S <sub>15</sub>	E S <sub>14</sub>	E B <sub>13</sub>	E S <sub>14</sub>	E S <sub>14</sub>	E S <sub>14</sub>	26	32	29	E B <sub>46</sub>	G	G	G	G	G	18	E	E	E	E	E	E S <sub>15</sub>	E S <sub>15</sub>	
31	E S <sub>15</sub>	E S <sub>15</sub>	E	E	E S <sub>15</sub>	E	E	G	G	27	30	G	G	G	G	G	G	19	20	E	17	E	E	E	E	
CNT	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	29	30	29	30	30	30	30	30	
MED	E	E	E	E	E	E	E	E	G	G	34	36	36	34	32	27	20	17	17	E	E	E	E	E	E	
UQ	E S <sub>16</sub>	16	15	E	E	E	E	E	27	32	37	40	39	37	36	U	34	29	21	21	18	17	17	E S <sub>16</sub>	E S <sub>16</sub>	
LQ	E	E	E	E	E	E	E	G	G	G	32	35	G	G	G	G	G	G	E	E	E	E	E	E	E	

DEC. 1982

FBES (0.1 MHZ)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1982

F-MIN (0.1 MHz)

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

Station		R		K		O		K		U		B		U		N		J		I		T		O		K		Y		O		Lat.		35		42.4		N		Long		139		29.3		E		Sweep		1		MHz		to		20		MHz		in		20		sec		in		automatic		operation	
Hour	Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																																														
1		E 16	E 15	E 15	13	13	E 15	E 15	E 15	13	14	15	17	16	17	16	E 40	16	E 16	E 16	E 15	E 16	13	E 15	E 15																																														
2		E 14	13	E 15	E 15	13	13	E 15	E 15	15	15	16	15	16	17	15	17	E 16	E 16	E 16	E 15	E 15	E 16	E 15	E 15																																														
3		E 16	13	13	13	E 14	E 15	E 15	E 16	15	15	16	17	17	17	15	14	E 15	E 16	E 16	E 15	E 16	E 15	13	E 16																																														
4		E 15	E 15	13	E 15	E 14	E 14	E 14	E 16	14	16	16	17	17	17	15	13	E 15	E 16	E 14	E 15	E 16	E 16	E 16	E 15																																														
5		E 15	13	E 15	E 15	12	E 15	E 15	E 15	15	15	16	17	17	17	17	16	E 15	E 16	E 15	E 15	E 16	E 15	E 16	E 16																																														
6		E 15	E 15	E 16	13	E 15	E 15	E 15	E 15	15	16	16	17	17	17	15	15	E 16	E 15	E 15	E 16	E 16	E 15	E 16	E 16																																														
7		E 16	E 14	13	E 15	E 15	E 15	E 16	E 15	16	16	17	17	17	19	16	15	E 15	12	E 15	E 15	E 15	E 16	E 15	E 15																																														
8		E 16	E 15	13	E 15	E 15	E 15	E 15	E 16	16	C	33	30	29	25	17	15	E 15	E 15	13	E 16	E 16	E 14	E 15	E 15																																														
9		E 15	E 14	E 15	E 15	E 15	E 15	E 16	E 15	15	17	18	21	21	19	19	15	E 15	E 14	E 15	E 15	E 15	E 15	E 15	E 15																																														
10		E 15	E 15	13	E 14	E 15	E 15	E 15	E 16	16	17	26	21	39	19	36	18	E 15	E 15	E 14	E 16	E 15	E 15	E 16	E 15																																														
11		E 16	E 15	E 14	E 16	E 14	E 15	E 15	E 17	16	17	19	19	21	17	32	15	E 16	E 16	E 16	13	13	E 16	E 16	E 15																																														
12		E 15	E 15	E 15	13	E 15	12	E 16	E 14	14	16	18	18	18	19	17	16	E 15	E 15	E 15	E 16	E 16	E 16	E 15	E 15																																														
13		E 15	13	13	E 15	13	E 15	E 16	E 14	14	15	17	17	17	19	17	16	E 16	E 15	E 16	E 16	E 15	E 15	E 16	E 16																																														
14		E 16	E 14	E 15	E 15	E 15	E 15	E 16	E 16	16	17	17	20	19	18	17	16	E 16	E 15	E 14	E 15	13	E 16	E 16	E 16																																														
15		E 16	E 15	E 15	13	E 14	E 15	E 15	E 15	17	17	17	80	20	18	16	16	E 16	E 15	E 15	E 15	E 15	E 16	E 16	E 16																																														
16		E 16	E 16	E 16	E 15	13	E 15	E 16	E 16	15	17	15	18	18	E 21	E 18	E 17	E 15	E 15	E 15	E 16	E 16	E 15	E 15	E 15																																														
17		E 15	E 15	E 15	13	E 15	E 14	E 15	E 16	15	15	14	29	17	16	19	16	E 14	E 16	E 16	E 15	E 16	E 16	E 15	E 15																																														
18		E 15	13	13	E 15	E 14	E 16	E 15	E 15	19	15	15	16	17	17	15	14	E 15	E 16	E 16	E 15	E 15	E 15	E 15	E 15																																														
19		E 14	13	E 15	E 15	E 15	E 16	E 14	E 16	17	17	22	24	21	19	18	17	E 15	E 15	E 16	E 16	E 15	E 16	E 16	E 15																																														
20		E 16	E 15	E 14	13	13	E 15	E 16	E 15	19	26	24	27	28	26	20	19	16	E 14	E 16	E 16	E 15	E 15	E 16	E 16																																														
21		E 15	E 15	E 15	E 14	E 15	12	12	E 16	15	17	18	19	20	19	17	19	E 16	E 16	E 16	E 16	E 15	E 15	E 15	E 16																																														
22		E 15	E 15	E 14	E 15	E 14	E 15	E 15	E 15	16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C																																														
23		C	C	C	C	C	C	C	C	C	16	19	19	19	17	14	15	E 16	E 16	E 15	E 16	E 15	E 15	E 16	E 15																																														
24		E 15	E 15	E 14	13	E 14	E 15	E 15	E 15	15	17	16	17	17	17	20	16	E 16	E 15	E 15	E 16	E 15	E 15	E 15	E 16																																														
25		E 16	E 15	E 15	E 15	E 15	E 15	E 16	E 16	16	17	18	19	19	23	18	17	E 18	E 16	E 17	E 17	E 17	E 17	E 16	E 17																																														
26		E 17	E 14	E 16	13	E 15	E 17	E 17	E 17	17	19	18	24	24	18	19	17	17	E 16	E 17	E 16	E 17	E 17	E 17	E 16																																														
27		E 16	E 16	E 16	E 16	13	E 16	E 17	E 18	E 26	19	20	22	21	20	19	17	E 16	E 14	E 16	E 15	E 15	E 15	E 16	E 16																																														
28		E 16	E 15	E 15	13	13	13	13	E 16	16	30	29	29	29	26	21	17	E 16	E 14	E 16	E 15	E 16	E 16	E 16	E 15																																														
29		E 15	E 14	E 14	13	E 14	E 15	E 15	E 16	15	21	21	25	30	30	22	20	17	13	E 16	E 15	E 16	E 16	E 16	E 15																																														
30		E 16	E 15	E 15	E 14	13	E 14	E 14	E 14	15	17	20	46	21	21	19	17	15	E 16	E 15	E 15	E 15	E 15	E 15	E 15																																														
31		E 15	E 15	13	13	E 15	E 15	E 15	E 15	15	15	15	17	16	16	17	15	16	E 14	E 15	E 16	E 16	E 15	E 15	E 16																																														
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																																														
CNT		30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30																																														
MED		E 15	E 15	E 15	E 14	E 14	E 15	E 15	E 16	15	17	18	19	19	18	17	16	E 16	E 15	E 16	E 15	E 15	E 15	E 16	E 15																																														
UQ		E 16	E 15	E 15	E 15	E 15	E 15	E 16	E 16	16	17	20	24	21	20	19	17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16																																														
LQ		E 15	E 14	13	13	13	E 15	E 15	E 15	15	15	16	17	17	17	16	15	E 15	E 15	E 15	E 15	E 15	E 15	E 15	E 15																																														

DEC. 1982

F-MIN (0.1 MHz)

The Radio Research Laboratories, Japan

### IONOSPHERIC DATA

DEC. 1982

M(3000)F2 (0.01)

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 20 MHz in 20sec 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		270	270	315	330	340	275	280	310 <sup>S</sup>	330	320	320	320	300	310	300	310 <sup>C</sup>	310 <sup>C</sup>	310	320	290 <sup>S</sup>	300 <sup>S</sup>	290 <sup>S</sup>	265	275																														
2		270	270	285	290	315	275	275	300 <sup>S</sup>	290 <sup>S</sup>	330	340	320	325	310	310 <sup>S</sup>	315	320	330 <sup>S</sup>	325	330	335	305 <sup>S</sup>	270	260																														
3		265	275	295	330	290	270	280	305 <sup>S</sup>	325 <sup>S</sup>	320 <sup>S</sup>	320	315 <sup>S</sup>	300	305	315	310	300	310 <sup>S</sup>	315	280	285 <sup>S</sup>	310	275 <sup>S</sup>	250 <sup>S</sup>																														
4		255	255 <sup>S</sup>	260	270 <sup>S</sup>	300	275	290 <sup>S</sup>	305	320	320 <sup>S</sup>	320	305	300	300	290	315	310	310	300	300	285	280	270 <sup>S</sup>	270																														
5		280 <sup>S</sup>	260	280	270	270	260	280	330 <sup>S</sup>	315	305 <sup>S</sup>	290	295	290	290	295	305	310	300 <sup>S</sup>	300	310	295	285	275	275																														
6		285	270	285	270	300 <sup>S</sup>	280 <sup>S</sup>	290	J 320 <sup>S</sup>	320	310	320	295	315	310	340	315 <sup>S</sup>	310	300	310	310	300	300 <sup>S</sup>	280	250																														
7		255	I 260 <sup>S</sup>	255 <sup>S</sup>	250 <sup>S</sup>	270 <sup>S</sup>	260	280	340	320	315	295	300	305	300	295	300	300	305	305	290	295	265 <sup>S</sup>	235	235 <sup>S</sup>																														
8		240	235	240 <sup>S</sup>	240	250	255	285	305	315	I 310 <sup>C</sup>	290	305	290	290	295	300	305	305	270 <sup>S</sup>	300	320	275	250	250																														
9		250	255	250	245	230	265 <sup>S</sup>	300 <sup>S</sup>	290	305	290	290	285	285	285	285	290	290	295	310	305	290	255 <sup>F</sup>	270	265																														
10		240	245 <sup>S</sup>	330	285	280	275	260	320 <sup>S</sup>	315	320	290	285 <sup>H</sup>	290 <sup>R</sup>	300	290	295	310	290	J 285 <sup>S</sup>	275 <sup>S</sup>	230	230	260	275 <sup>S</sup>																														
11		270 <sup>S</sup>	270	230	I 240 <sup>S</sup>	235	290 <sup>S</sup>	305 <sup>S</sup>	310 <sup>S</sup>	285	295	290	280	290	285	290	280	275 <sup>S</sup>	295 <sup>S</sup>	295 <sup>S</sup>	285	300	285	285	290																														
12		300 <sup>S</sup>	F 260	240	F 240	270	F 250	265 <sup>J</sup>	300 <sup>S</sup>	300	300	J 305 <sup>R</sup>	285	290	280	280	290	290	285 <sup>S</sup>	300 <sup>S</sup>	315	280 <sup>S</sup>	285 <sup>S</sup>	245 <sup>S</sup>	250																														
13		280	295 <sup>S</sup>	290	275	250	270	290	310 <sup>S</sup>	325	315	305	300	290	300	310	280 <sup>S</sup>	315	300	310	320	280	300	270 <sup>S</sup>	275																														
14		270 <sup>S</sup>	275	F	265 <sup>S</sup>	F	F	290	305 <sup>S</sup>	320 <sup>S</sup>	310	305	300	290	295	295	290	300	300	310	320	295	290 <sup>S</sup>	265	255 <sup>S</sup>																														
15		260	260	300 <sup>S</sup>	290 <sup>S</sup>	345	260	270	300 <sup>S</sup>	315 <sup>S</sup>	320	295	290	290	290	320	300	310	310	305	285	305	250	290	270																														
16		280	270 <sup>S</sup>	270	275	265	275	290	310 <sup>S</sup>	330 <sup>S</sup>	315	295	295	285	285	285	290	305 <sup>S</sup>	300	300	300	310	235 <sup>H</sup>	250	250																														
17		245	245	260	255	245	245	250	290 <sup>S</sup>	295	295	300 <sup>S</sup>	295	295	290	280	280 <sup>S</sup>	290	290	295 <sup>S</sup>	285	240	245	260	255																														
18		265 <sup>S</sup>	250	285 <sup>S</sup>	270	260	285	245 <sup>S</sup>	290	310	310	295	305	300	295	305	305	300	300	290	285 <sup>S</sup>	310 <sup>S</sup>	280 <sup>S</sup>	280	270 <sup>S</sup>																														
19		305 <sup>S</sup>	A	265 <sup>S</sup>	245 <sup>S</sup>	250	265	300	305 <sup>S</sup>	300	295 <sup>S</sup>	300	300	290	290	290	290	290 <sup>S</sup>	A	290 <sup>S</sup>	J 295 <sup>S</sup>	320	A	240	240 <sup>S</sup>																														
20		245	300	A	250 <sup>S</sup>	250	250	265	310	340	300	310	305	300	300	290	300	315 <sup>S</sup>	285	320	310	290 <sup>S</sup>	225	230	230																														
21		275	275	310	245	250	245	280	325	305	315	320	310	305	310	310	315	320	305	290	325 <sup>S</sup>	340	260	255	270 <sup>S</sup>																														
22		250	245	245	290	250	280	290	310	300	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c																														
23		c	c	c	c	c	c	c	c	c	J 305 <sup>S</sup>	305 <sup>S</sup>	320	320	295	310	320	310 <sup>S</sup>	315	290	300	325	295 <sup>S</sup>	245	s																														
24		270 <sup>S</sup>	250 <sup>S</sup>	280	250	235	245	280	300 <sup>S</sup>	315	310	310	300 <sup>S</sup>	310	315	310	310	320	325	280	310	345	285	270	260																														
25		270	275	270	250	250	270	280	315 <sup>S</sup>	330 <sup>S</sup>	330	330	325	330	320	320	320	340	310	330	285	300	305 <sup>S</sup>	290	250																														
26		245	270	270	300	255	285	280	305	330	350	350 <sup>R</sup>	315	315	315	330	325 <sup>S</sup>	315	315	305 <sup>S</sup>	320	320	295	260	270																														
27		270	275	295	290 <sup>S</sup>	300	255	275	320	330	310 <sup>S</sup>	290	300 <sup>H</sup>	310	300	295	310	320	300 <sup>S</sup>	290	315 <sup>S</sup>	295	285 <sup>S</sup>	275 <sup>S</sup>	260 <sup>S</sup>																														
28		255	300	320	300	260	265	275	315	330 <sup>S</sup>	320	330	320	300	300	305	305	320	310	310 <sup>S</sup>	310	290	290	280	280 <sup>S</sup>																														
29		250 <sup>S</sup>	270 <sup>S</sup>	270	280	285	310	290	310 <sup>S</sup>	330	330	320	320	285	300	310	310	295	310	330	320	290 <sup>S</sup>	270	285	310																														
30		260	260	265	290	335	290	280	310 <sup>S</sup>	310	330	340	320	310	305	305	310	310	310 <sup>S</sup>	305 <sup>S</sup>	320	300 <sup>S</sup>	300	285	285																														
31		285	285	275	260	275 <sup>S</sup>	275	325 <sup>S</sup>	325 <sup>S</sup>	330 <sup>S</sup>	300 <sup>S</sup>	320	320	325	285	315	340 <sup>S</sup>	320	305	295 <sup>S</sup>	330 <sup>S</sup>	275 <sup>S</sup>	285	280	290																														
		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	28	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	29	30	29																														
MED		268	270	272	270	265	270	280	310 <sup>S</sup>	318	312	305	302	300	300	302	305	310	305	302	308	298	285	270	265																														
UQ		275	275	292	290	290	275	290	315 <sup>S</sup>	330	320	320	320	310	305	310	315	315	310	310	320	310	295	280	275																														
LQ		250	255	260	250	250	260	275	305 <sup>S</sup>	305	305	295	295	290	290	290	290	300	300	290	290	290	265	255	250																														

DEC. 1982

M(3000)F2 (0.01)



# IONOSPHERIC DATA

DEC. 1982

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station **RKUBUNJI TOKYO** Lat. **35° 42.4' N** Long **139° 29.3' E** Sweep **↑** MHz to **20** MHz in **20** 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										
2											L	L	L	L										
3										L	L	A	L	L										
4											L	L	L	L										
5											L		L	L	L									
6										L	L	L		L										
7											L		L											
8										C	L		L											
9											A	L	L	L	L									
10										L				L										
11											L	L		A										
12										L				A	A									
13											L													
14												L												
15												B			L	L								
16										L	L	L	L											
17										L			L	L										
18											L		L	L										
19											A	A	L	L		A								
20													A											
21										L			L	A	A									
22										C	C	C	C	C	C	C								
23												L												
24											L	L	L	L	L									
25											L		L	L										
26													L	L										
27											L		L	L										
28											L	L	L		L									
29														L	L									
30													L											
31											L	L		L	L									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

DEC. 1982

M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9 h)

Station **R**KUBUNJI TOKYO Lat. 35° 42.4' N Long 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											235	225	240	235										
2											235	235	240	240										
3										240	240	235	260	265										
4											240	265	250	240										
5											250		280	260	250									
6										255	245	235		265										
7											230		255											
8										c	285		235											
9											240	295	260	250	255									
10										245				245										
11											260	250		270										
12										275				280	E A 280									
13											255													
14												235												
15												B 250			250	L 275								
16										245	250	265	245											
17										260			260	300										
18											240		235	270										
19											250	255	235	235		A 240								
20													230											
21										255			270	245	245									
22										c	c	c	c	c	c	c								
23											260													
24											250	270	250	235	225									
25											250		245	225										
26													260	230										
27											260		225	245										
28											235	240	285		250									
29														275	235									
30													250											
31											255	245		305	250									
CNT											7	19	15	20	20	9	2							
MED											255	250	250	250	248	250	258							
UQ											258	252	262	260	270	250								
LQ											245	240	235	238	238	245								

DEC. 1982

H<sup>o</sup>F<sub>2</sub> (KM)

# IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		ROKUBUNJI TOKYO		Lat.	35 42.4 N		Long	139 29.3 E		Sweep 1 MHz to 20 MHz in 20sec 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	320	330	255	220	210	E S 305	310	235	230	235	220	225	215	215	225	230	220	210	220	220	240	225	E S 340	320	
2	320	300	300	265	235	E B 270	E S 295	225	225	230	195	230	225	200	240	235	230	210	225	190	270	E A 290	E S 305	340	
3	E S 325	325	255	220	240	E S 320	E S 295	245	H 225	230	235	A	245	245	235	H 225	230	215	240	260	240	235	A	330	
4	350	345	320	305	255	295	225	230	250	235	230	235	230	220	240	245	225	210	240	235	220	255	280	E S 315	
5	300	335	310	315	280	315	260	235	235	230	H 235	240	H 225	225	240	240	215	245	225	225	H 220	H 235	280	280	
6	E A 315	305	290	280	260	285	235	225	215	H 210	235	220	230	235	230	235	225	205	240	245	230	230	260	305	
7	285	305	325	290	265	285	245	230	210	225	220	245	240	230	235	235	240	225	220	230	230	285	E S 380	E S 390	
8	385	385	350	385	350	330	260	240	240	C	255	235	230	235	240	240	230	220	245	245	E A 260	235	325	325	
9	E A 345	320	335	370	E S 415	315	240	270	225	235	A	H 220	240	230	235	255	220	A 225	245	235	235	250	285	320	
10	355	360	225	250	240	E S 325	E S 270	240	220	230	215	225	240	230	240	250	225	200	235	255	E A 305	E S 330	245	290	
11	235	260	E S 385	E S 365	365	260	220	210	225	240	240	E A 240	240	A	245	240	235	A 225	250	235	255	255	270	260	
12	270	E A 320	E A 410	E A 400	300	330	285	230	230	240	240	225	245	A	A	250	230	205	220	220	220	235	280	315	
13	285	250	270	300	340	305	280	245	235	235	220	235	220	230	230	235	210	215	215	230	260	245	E S 280	290	
14	295	280	295	290	325	320	245	230	225	230	230	225	240	235	240	240	225	215	230	215	235	225	275	E S 335	
15	300	300	260	230	210	E S 335	310	245	240	230	225	B	225	230	230	215	225	205	240	260	230	250	230	E S 300	
16	305	300	300	295	265	295	255	245	230	235	H 235	235	225	240	230	245	220	220	220	240	210	345	E S 325	335	
17	E S 350	330	315	305	350	340	330	245	235	225	H 235	240	235	235	245	230	A	230	250	255	320	305	290	280	
18	285	325	255	255	235	280	350	270	230	230	H 220	H 240	225	210	H 235	220	220	265	260	280	235	280	235	240	
19	275	A	E A 370	E A 335	295	285	250	235	230	E A 260	A	A	225	225	230	A	A	A	255	220	235	A	E A 400	350	
20	285	250	A	E A 455	E A 385	E S 405	335	255	220	215	230	240	A	235	235	240	220	235	240	225	220	E A 410	390	385	
21	290	290	245	405	385	E A 395	280	230	235	230	235	230	230	A	A	230	220	215	245	230	230	E A 300	315	320	
22	320	385	335	275	260	285	265	225	230	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	225	225	230	240	225	230	230	230	215	235	220	220	245	E S 260	E S 340	
24	290	340	300	E B 370	E S 425	E S 370	280	245	235	235	230	220	235	230	220	215	H 230	200	255	275	235	A 240	305	340	
25	305	295	315	345	340	320	305	260	230	215	230	220	230	225	220	235	220	215	220	245	245	210	240	E S 320	
26	E S 365	305	320	260	E A 300	E S 305	305	250	230	H 225	215	220	230	225	235	220	220	225	245	235	220	255	E S 320	E S 325	
27	E A 350	E A 355	E A 295	285	255	E A 340	305	235	220	225	225	220	225	215	240	230	210	220	220	230	240	245	285	300	
28	345	305	240	240	305	315	280	225	230	230	235	225	210	H 240	225	240	225	215	220	235	250	255	300	275	
29	345	325	330	280	E A 285	255	270	265	215	H 230	H 215	H 235	H 225	H 245	235	225	220	220	220	200	225	300	265	245	
30	E S 330	360	355	275	230	260	E S 295	245	210	230	H 230	220	H 205	H 225	230	240	215	215	240	225	220	250	265	E S 275	
31	E S 280	295	310	330	310	290	230	225	220	225	230	225	H 235	H 210	H 215	H 225	210	235	250	215	240	250	305	270	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	29	29	30	30	30	30	30	30	29	28	27	29	27	28	29	28	29	30	30	30	29	29	30	
MED	299	312	305	285	U 275	298	271	238	230	230	230	228	230	230	235	235	222	215	240	232	234	248	275	U 302	
UQ	332	332	325	U 325	325	322	305	245	235	235	235	235	240	235	240	240	230	225	245	245	242	U 270	U 300	328	
LQ	285	298	265	265	248	285	248	230	220	225	220	222	225	225	230	230	220	210	220	220	220	220	235	265	278

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H<sup>o</sup>F (KM)

### IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>E (KM)

135° E Mean Time (G.M.T. + 9 h)

Station: **OKUBUNJI TOKYO** Lat. **35 42.4 N**, Long **139 29.3 E** Sweep 1 MHz to 20 MHz in 20sec 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 120	105	105	105	110	A	E A 125	110	C	A								
2								S	110	105	105	105	105	110	110	115		S							
3								S	110	115	A 125	E A 115	E A 115	A	110	115	A 135	E A 125	E S 125						
4								S	A 115	E A 120	A	110	105	105	E A 115	E A 120	A	A							
5								S	110	110	105	115	A 110	A 120	110	E A 115	120								
6								S	110	110	110	105	105	A	E A 115	E A 125	A								
7								E S 125	110	110	110	110	110	A	A	A	A								
8								S	110	C	E B 125	E B 125	115	115	E A 125	E A 120		S							
9								E S 125	110	110	110	110	115	110	A	A	A								
10								E S 130	115	115	115	110	B	110	B	A	E A 130								
11								S	120	115	110	115	115	110	A	A	A								
12								A	A 120	110	110	110	A	110	110	A	A								
13								A	A	115	110	110	A	110	A	A	A								
14								S	A 120	E A 120	E A 125	A	A	E A 130	A	E A 125	A								
15								S	115	110	A	B	E A 125	115	E A 120	A	A								
16								S	E A 115	110	110	105	E A 135	E A 140	A	E A 125	A	S							
17								S	E A 125	A 120	A 120	E B 120	110	A	A	A	A								
18								A	115	110	105	105	105	E A 130	A	A	A								
19								E S 135	125	115	115	120	B	115	110	110	120	A							
20								A	120	B 120	115	B 120	A	A	A	A	A								
21								S	E A 120	E A 120	A	E A 135	E A 135	E A 120	A	A	A								
22								S	125	C	C	C	C	C	C	C	C								
23								C	C	110	110	110	115	115	A 120	E A 125	E A 135	E S 135							
24								S	115	110	105	110	105	E A 120	115	E A 135	A								
25								S	120	110	105	110	110	115	115	115	E A 125								
26								S	120	115	110	115	120	115	A 115	115	A	A							
27								C	C	110	115	115	120	E A 115	E A 120	115	E A 120								
28								S	120	B	A	E A 130	E A 130	E A 120	E A 125	A	A								
29								S	115	115	110	115	E B 120	E B 125	E A 120	120	125								
30								S	110	A	E A 120	B	E A 120	E A 125	E A 125	115	E A 130								
31								S	115	E A 135	E A 130	105	105	110	115	115	120								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								5	28	27	27	27	26	26	20	15	9								
MED								E S 125	115	110	110	110	112	112	A 112	E A 120	E E 125								
UQ								E S 130	120	115	112	114	118	E A 120	E A 120	E A 125	E A 130								
LQ								E S 125	110	110	110	110	110	110	111	115	E E 120								

DEC. 1982

H<sup>o</sup>E (KM)

# IONOSPHERIC DATA

DEC. 1982

H°ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		R		OKUBUNJI		TOKYO		Lat.	35 42.4 N		Long	139 29.3 E		Sweep	1 MHz to 20 MHz		in 20sec		in automatic operation											
Hour	Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1		S	S	S	B	B	S	S		110	120	E G	170	150	145	110	110	G	C	120	95	95	135	S	105	105	110			
2		115		B	S	S	B	B	S	G	G	G		125	G	120	G	E G	175	G	S	100	125	120	120	120	120	115		
3		115		B	B	B	S	S		100	S	105	125	E G	170	140	155	145	130	155	105	110	110	100	140	125	110	130		
4		110	115		B		110	105	S	105	105	E G	170	135	120	E G	165	120	105	100	125	135	130	S	S	S	S	105		
5		105	105	105	105				B	S		100	100	115	120	140	125	120	105	115	105	G	100	100	95	S	105	105	105	
6		100	100	100	105	100	100		S	G	G		120	115	110		G	105	100	100	100	100	100	105	100	100	100	S	S	
7		S		115	100		S	S		100		S	G	G	G		120	115	115	110	110	110	105	100	100	105	100	100	S	S
8		105	105	110	110	110	110	115		G	145	C	120	120	120		G	110	100	100	100	100	100	115	110	S	105	115		
9		105	105		S	S	S	S		100	G	130	120	115	115	125	115	110	110	150	105	105	105	100	95	95		S		
10		105	105	100	105		S		S	G	G		140	130	120	115	120	115	110	110		S	110	100	100	100	100	95		
11		95	95		S	S	S	S	S		105	G		125	120	115	115	125	115	105	110	110	105	105	105	105	115	115	100	
12		95	100	105	105	105	110	115	105	105	160	120	120	115	110	110	110	105	105	100		S	S		95	S	S	95		
13		100	105	100	100	105	105	100	100	100	105	135	130	100	125	115	110	110	95	95	95	100		S	S		S	100		
14		S	S	S		95	S	S		105	S	135	110	110	110	130	125	105	105	115	105	100	100	100	100	100	100	100	S	
15		S	S	S		B	S		100		130	G	G	105	B	100	100	100	100	100	100	100	95	100		S	S	125	100	
16		100		S	95	S	105	S	S	S		105	G	G		115	110	115	110	110	100	100	100	100	100	100	100	S	100	S
17		S		110		S	B	110	110		S	S		115	105	120	130	115	110	105	105	100	100	100	110	110	110	110	125	
18		135	125	125		S	105	S		150	105	140	140	115	150	110	105	100	110	100	110	110	110	110	110	110	110	105	105	110
19		110	105	105	105	100		S	S	155	135	120	115	115	115	110	120	110	110	105	105	100	95	95	95	95	95	95	95	
20		95	105	105	105	105	100	100	100	100	125	130	125	120	110	110	105	105	100	95	95	95	95	95	95	95	95	100	95	
21		95	100		S	115	110	110	110	110	105	110	130	135	125	120	115	115	100	100	105	100	100	100	95	95	95	S		
22		115	115	115	105		S	S	S	S	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23		C	C	C	C	C	C	C	C	C	C	G	G		155	120	110	105	155	100	95	95	S	95	S	S	S	110		
24		100	105	105		B	S	S	S	S	G		135	135	125		G	130	125	120	95	95	95	110	110	110	110	110		
25		S		105	105	100	100	100	100	100	G	120	115	G	G	G	120	G	110	105	S	S	S	S	S	S	100	105		
26		115		S	S	B	100	105	S	S	G	G		115	120	145	130	120	100	100	115	S	105	S	S	S	S	100		
27		100	100	100	100	100	95	95		C	C	G		130	135	130	125	120		G	100	100	100	100	100	100	100	100	S	
28		S		105	100	100		B	B	B	S	G		150	125	125	125	115	110	110	110	115	100	S	S	110	100	100		
29		100	100	100	100	100	95	100	100		G	G		115	115		G	G	105	G	G	105	S	S		S	S	S		
30		S	S	S	S	B	S	S	S		115	110	110		B	110	110	110		G	105	105	105	105	100	100		S	S	
31		S	S		105	100	S	100	100	110	G	115	110	G	G	G	G	G	G	140	130	110	100	100	95	95				
		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	21	18	17	15	16	14	14	16	21	28	25	25	25	28	23	26	29	27	24	21	23	21	22					
MED		105	105	105	105	105	102	100	105	115	120	120	120	115	115	110	110	105	100	100	100	102	100	100	105	105				
UQ		110	105	105	105	108	108	110	110	132	135	130	130	125	125	116	110	110	105	105	110	110	108	110	110					
LQ		100	100	100	100	100	100	100	100	105	115	115	115	110	110	105	105	100	100	100	100	100	100	100	100	100	100	100	100	

DEC. 1982

H°ES (KM)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1982

TYPES OF ES

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

Station **OKUBUNJI TOKYO** Lat. **35 42.4 N**, Long **139 29.3 E** Sweep **1** MHz to **20** MHz in **20**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							L1	C2	H1	H1	H1	L2	L2				L1	F2	F1	FF21		F1	F1	F2	
2	F1										C1		C1		H2			F1	FF31	F4	F4	F4	F2	F2	
3	F1						F1		L1	HL21	HL22	HL11	HL11	H2	HLL32	HLL23	L1	FF12	F1	F1	FF11	F4	F5	FF11	
4	F5	F2		F2	F2	F1		L1	L2	HL13	CL11	C1	H1	CL11	L2	L3	CL22	FF21	F2	F1		F2		F3	
5	F1	F4	F1	F2			F1	L1	C2	C2	HC11	HL12	C2	L1	C2	L2		F2	F3	F3		F3	F2	F2	
6	F6	F2	F1	F1	F2	F1				C2	C2	C2		L2	L2	L2	L1	F1	F1	F1	F1	F1			
7		F2	F3			F1					C2	C2	C3	L1	L3	L3	L4	F6	F4	F2	FF11	F1	F1	F2	
8	F1	F3	F3	F2	F2	F1	F1		H2		C1	C1	C1		LL11	L1	L1	F5	F3	F2	F5		F1	F1	
9	F4	F2					F1		H2	C2	C2	C2	C1	C2	L2	L3	HL22	F5	F6	F2	F2	F2	F1		
10	F1	F2	F5	F2		F2				H1	C1	C1	C2	C2	C1	L2	L1		FF11	F3	F4	F2	F3	F2	
11	F1	F1						L1		C2	C1	C2	C2	HC21	L1	L4	L4	F6	F3	F4	F3	FF23	FF22	F2	
12	F2	F3	F3	F3	F4	F2	FF11	L2	L1	H2	C1	C2	CL21	C3	C3	L4	L4	F2	F1			F3		F3	
13	F2	F1	F2	F1	F1	F1	F2	L4	L3	L1	HL11	HL11	L1	CL11	CL21	LL21	L1	F4	F2	F2	F3			F1	
14				F1			F1		HL21	L2	L2	L1	HL12	HL12	L2	L3	LL21	F4	F2	F3	F2	F1	F1		
15					F1			H2			L1		L1	L1	L1	L3	L3	F3	F2	F2			F1	F2	
16	F1		F1		F1				L1			C2	L1	L1	LL31	LL21	L1	LK11	F1	F3		F1			
17		F2			F2	F1			L2	L2	CL11	HC11	C1	L2	L2	L4	L4	F4	F4	FF42	F2	F5	F4	F2	
18	F2	FF22	F1		F1		FF11	L1	H1	H2	C3	HC11	C1	L1	L4	LL32	L2	FF33	FF21	FF51	F5	F4	F5	FF22	
19	F4	F5	F3	FF22	F2			H2	H1	C2	C3	C3	C1	C1	C1	C3	L3	F4	F5	F3	F3	F4	F3	F1	
20	F1	F3	F4	F5	F2	F1	F2	L1	C1	C1	C1	C1	L1	L2	L2	L2	L2	F3	F3	F1	F3	F2	F1	F1	
21	F1	F1		FF21	F2	F3	F4	L2	L2	L1	HL21	CL11	CL11	CL31	CL21	L1	L2	F1	F1	F3	F4	F2	F1		
22	F2	F4	F2	F2																					
23												H1	C1	LL11	LL11	HL12	L2	F2	F1		F1			F1	
24	F1	F3	F2						H2	H1	C1		CL11	C1	LL11	L1	L1	F1	F2	F3	F3	F1	F1	F1	
25		F1	F2	F2	F1	F2	F1	L1		C2	C1				C1		L1	F1					F1	F3	
26	FF11				F3	F1					C1	C1	C1	CL11	C1	L1	L1	FF11		F1				F2	
27	F3	F4	F3	F2	F2	F2	F1			H2	H1	H1	CL11	CL11			L1	F4	F3	F2	F3	F1	F1		
28		F2	F2	F1					H1	L1	L1	L1	C2	L1	L2	LL21	FF11	F1				F1	F2	F2	
29	F1	F3	F3	F2	F3	F2	F1	L1			C1	C1			L1			F1			F1				
30									C2	L1	L1		L1	L1	L1		L1	F2	F2	F1	F1	F1			
31			F1	F1		F1	F2	L1		L2	L2							F5	FF31	FF11	F3	F2	F2	F1	
	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																									

DEC. 1982

TYPES OF ES

# IONOSPHERIC DATA

DEC. 1982

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	YAMAGAWA							Lat. 31 12.1 N			Long 130 37.1 E			Sweep 1 MHz to 20 MHz in 20sec 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 47	X 44	X 60	X 45	X 29	X 28	X 29												X 82	X 81	X 76	X 62	X 46	X 44
2	X 45	X 43	X 42	X 43	X 43	X 31	X 32												X 82	X 79	X 67	X 66	X 43	X 39
3	X 44	X 48	X 57	X 53	X 32	X 28	X 28												X 79	X 70	X 82	X 78	X 66	X 52
4	X 42	X 41	X 45	X 47	X 49	X 40	X 48												X 102	X 82	X 86	X 73	X 61	X 46
5	X 43	X 43	X 42	X 40	X 41	X 39	X 40												X 114	X 87	X 67	X 66	X 53	X 45
6	X 43	X 41	X 40	X 40	X 42	X 34	X 35												X 90	X 83	X 85	X 67	X 56	X 44
7	X 41	X 41	X 42	X 41	X 43	X 38	X 40												X 114	X 100	X 90	X 79	X 65	X 60
8	X 64	X 60	X 64	X 67	X 65	X 66	X 66												X 90	X 91	X 80	X 57	X 47	X 50
9	X 48	X 48	X 43	X 43	X 44	X 45	X 50												X 134	X 116	X 102	X 83	X 62	X 54
10	X 46	X 48	X 66	X 37	A	X 29	X 31												X 120	X 116	X 98	X 89	X 92	X 76
11	X 81	X 78	X 68	X 61	X 59	X 61	X 68												X 96	X 81	X 76	X 77	X 62	X 54
12	X 46	X 44	X 39	X 39	X 38	X 39	X 39												X 184	X 175	X 165	X 152	X 119	X 99
13	X 93	X 90	X 67	X 50	X 42	X 41	X 41												X 90	X 80	X 68	X 70	X 63	X 47
14	X 42	X 45	X 37	X 38	X 38	X 37	X 43												X 123	X 121	S 109	X 106	X 91	X 69
15	X 68	X 69	X 67	X 63	X 55	X 36	X 35												X 91	X 86	X 86	X 74	X 69	X 51
16	X 49	X 51	X 51	X 50	X 47	X 37	X 41												X 147	X 132	X 102	X 76	X 52	X 55
17	X 50	X 53	X 49	X 45	X 39	X 40	X 40												X 143	X 132	X 98	S 101	X 83	S 67
18	X 72	X 80	X 91	X 63	X 67	X 70	X 71												S 103	X 103	X 112	S 99	H 92	X 65
19	X 57	X 50	X 51	X 50	X 46	A	X 65												S 103	X 93	X 92	X 70	X 66	X 71
20	X 72	X 65	X 50	X 43	X 37	X 38	X 39												c	c	c	c	c	c
21	c 69	c	c	c	c	c	c												X 99	X 80	X 62	X 66	X 71	X 47
22	X 49	X 47	X 49	X 51	X 48	X 44	X 47												X 87	X 87	X 99	S 82	X 71	X 54
23	X 39	X 40	X 40	S 47	X 53	X 28	X 25												X 112	S 98	X 80	X 79	X 52	X 40
24	X 43	X 44	X 44	X 41	X 42	X 45	X 53												X 76	S 62	X 81	X 76	X 55	X 44
25	X 46	X 46	X 38	X 37	X 37	X 39	X 37												S 99	X 81	H 90	X 102	X 81	X 66
26	X 49	X 48	X 44	X 40	X 37	X 36	S 39												X 89	X 90	X 89	X 85	X 67	X 49
27	X 48	X 45	X 45	X 41	X 39	X 36	X 38												X 146	X 130	S 119	X 136	X 120	X 90
28	X 77	X 80	H 71	X 57	X 45	X 39	X 40												X 86	X 76	X 79	X 71	X 58	X 46
29	X 41	X 45	S 45	X 43	X 46	X 38	S 37												X 130	X 122	S 103	X 77	X 71	X 58
30	X 43	X 42	X 42	X 57	X 51	X 33	X 33												X 89	X 96	S 86	X 65	X 40	X 40
31	X 42	X 39	X 40	X 37	X 39	X 40	X 41												X 86	X 108	H 90	X 61	X 53	X 51
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	30	29	29	30												30	30	30	30	30	30
MED	X 47	X 46	X 45	X 44	X 43	X 38	X 40												X 99	X 90	X 88	X 76	X 64	X 52
UQ	X 60	X 53	X 60	X 51	X 48	X 40	X 47												X 120	X 116	X 99	X 85	X 71	X 65
LQ	X 43	X 43	X 42	X 40	X 39	X 36	X 35												X 89	X 81	X 80	X 67	X 53	X 46

DEC. 1982

FXI (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982
FOF2 (0.1 MHz)
135° E Mean Time (G.M.T. + 9 h)

Station Hour Day	YAMAGAWA																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	41	38	54	39	23	22	23	54	100	127	138	123	114	124	124	121	107	101	76	75	70	56	40	38
2	39	37	36	37	37	25	26	53	99	120	107	109	115	118	115	109	114	105	76	73	61	60	37	33
3	38	42	51	47	26	22	22	52	98	116	122	105	98	117	138	122	107	104	73	64	76	72	60	46
4	36	35	39	41	43	34	42	67	106	127	128	143	138	139	139	135	122	120	96	76	80	67	55	40
5	37	37	36	34	35	33	34	61	87	104	110	139	129	136	145	135	122	107	108	81	61	60	47	39
6	37	35	34	34	36	28	29	58	89	110	112	128	118	124	124	124	112	98	84	77	79	61	50	38
7	35	35	36	35	37	32	34	60	88	102	110	119	133	143	147	140	137	135	108	94	84	73	59	54
8	58	54	58	61	59	60	60	64	91	109	145	154	132	126	133	120	119	117	84	85	74	51	41	44
9	42	<sup>S</sup> 42	37	37	38	39	44	66	139	161	164	160	163	169	168	164	168	152	128	110	96	77	56	48
10	40	42	60	31	A	23	25	57	98	120	132	138	149	146	142	145	137	129	114	110	92	83	86	70
11	75	72	62	55	53	55	62	74	87	110	128	149	145	135	127	113	121	112	90	75	70	71	56	48
12	40	38	33	33	32	33	33	62	95	134	164	145	144	145	156	163	169	172	178	169	159	146	113	93
13	87	84	61	44	36	35	35	57	110	121	125	124	122	121	111	115	113	95	84	74	62	64	57	41
14	36	F	31	32	32	31	37	59	102	125	136	130	130	132	135	133	133	133	117	115	103	100	85	63
15	62	63	61	57	49	30	29	54	95	123	127	118	137	145	152	139	127	112	85	80	80	68	63	45
16	43	45	45	44	41	31	35	55	101	122	134	129	139	156	179	175	164	159	141	126	96	70	46	49
17	44	47	43	39	33	34	34	62	109	142	160	156	155	160	147	141	146	127	137	126	92	95	77	61
18	66	74	85	57	61	64	65	87	133	126	138	140	139	132	126	120	120	122	97	97	106	93	86	59
19	51	44	45	44	40	A	F	81	128	153	157	163	169	153	139	134	137	118	97	87	86	64	60	65
20	66	59	44	37	31	32	33	62	109	135	143	141	142	143	135	I C 135	C	C	C	C	C	C	C	C
21	C 63	I C 58	C	C	C	C	I C 46	70	C	I C 99	I C 119	132	134	135	133	126	113	113	93	74	56	60	65	41
22	43	41	43	45	42	38	41	60	85	120	128	138	139	137	128	124	125	113	81	81	93	<sup>S</sup> 76	65	48
23	33	34	34	<sup>S</sup> 41	47	22	19	44	94	115	109	114	120	118	135	127	<sup>H</sup> 126	111	106	<sup>S</sup> 92	74	73	46	34
24	37	38	38	35	36	39	47	60	96	126	147	146	143	138	137	126	104	109	70	56	75	70	49	38
25	40	40	32	31	31	33	31	45	<sup>S</sup> 99	124	126	139	117	122	115	120	121	125	93	<sup>H</sup> 75	84	<sup>S</sup> 96	<sup>S</sup> 75	60
26	43	<sup>S</sup> 42	38	34	31	30	<sup>S</sup> 33	47	101	136	123	97	114	122	124	115	113	91	83	84	83	79	61	43
27	42	39	39	35	33	30	32	55	<sup>S</sup> 97	105	115	135	124	125	134	139	<sup>H</sup> 139	140	140	<sup>J S</sup> 124	<sup>S</sup> 113	<sup>S</sup> 130	<sup>S</sup> 114	<sup>S</sup> 84
28	71	<sup>S</sup> 74	<sup>H</sup> 65	51	39	33	34	55	91	110	125	104	98	107	117	125	120	100	80	70	73	65	52	40
29	35	39	39	37	40	32	31	41	120	101	118	133	146	<sup>H</sup> 154	148	156	148	141	124	116	<sup>S</sup> 97	71	65	52
30	37	36	36	51	45	27	27	45	103	102	116	120	116	108	110	114	121	99	83	90	80	59	34	34
31	36	33	34	31	33	34	35	44	76	95	115	137	132	136	136	149	126	<sup>S</sup> 95	80	102	<sup>H</sup> 84	55	47	45
CNT	31	30	30	30	29	29	30	31	30	31	31	31	31	31	31	31	30	30	30	30	30	30	30	30
MED	41	42	39	38	37	32	34	58	98	120	127	135	133	135	135	127	122	113	93	84	82	70	58	46
UQ	54	54	54	45	42	34	41	62	106	126	138	142	142	144	144	140	137	129	114	110	93	79	65	59
LQ	37	37	36	34	33	30	29	54	91	110	117	122	119	123	125	120	114	104	83	75	74	61	47	40



# IONOSPHERIC DATA

DEC. 1982

FOF1 (0.01 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station	YAMAGAWA																							
Lat.	31 12.1 N												Long 130 37.1 E											
Sweep	1 MHz to 20 MHz in 20 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									
2										L	L	L	L	L	L	L								
3											L	L	L	L	A	L								
4											L	L	L	L	L	L								
5												L	L	L	L	L								
6												L	L	L	L	L								
7											L	L	L	L	L	L								
8											L	L	L	L	L									
9											L	L	L	L	L	L	L							
10												L	L	L	L	L								
11								L	L	L	L	L	L	L	L	L	L	L						
12								L	L	L	L	L	L	L	L	L	L	L						
13								L	L	L	L	L	L	L	L	L	L	L						
14								L	L	L	L	L	L	L	L	L	L	L						
15								L	L	L	B	L	L	L	L	L	L	L						
16								L	L	L	L	L	L	L	L	L	L	L						
17									L	L	L	L	L	L	L	L	L	L						
18								L	L	L	L	A	L	L	L	L	L							
19								L	L	L	L	L	A	L	A	L	L							
20								L	L	L	L	L	L	L	L	L	C	C						
21								C	C	C	L	L	L	L				L						
22									L	L	L	L	L	L	L	L								
23										L	L	L	L	L	L									
24										L	L	L	L	L	L	L								
25										L	L		L	L										
26									L	L	L	L	L	L										
27										L	L	A	L	L										
28										L		L	L	L	L									
29										L	L	L	L	L	L									
30											L	L	L	L	L									
31											L	L	L	L	L									
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																								
MED																								
UQ																								
LQ																								

DEC. 1982

FOF1 (0.01 MHZ)

### IONOSPHERIC DATA

DEC. 1982

F0E (0.01 MHz)

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

Station		YAMAGAWA							Lat. 31 12' N		Long 130 37' E		Sweep 1 MHz to 20 MHz in 20sec 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	235	295	330	350	A	350	A	310	250	S							
2								S	235	295	320	355	360	350	335	305	A	200							
3								S	240	290	335	355	A	340	330	305	275	A							
4								S	240	A	A	360	355	A	330	315	A	S							
5								S	250	310	340	A	A	A	A	305	260	S							
6								S	245	A	A	A	A	A	A	A	265	175							
7								S	235	310	A	A	A	A	A	A	A	S							
8								S	260	B	380	A	A	A	A	325	280	S							
9								S	250	320	300	A	A	A	A	A	280	175							
10								S	A	320	365	385	B	380	B	A	A	S							
11								S	240	300	340	370	A	360	B	310	220	A							
12								S	250	300	A	380	A	340	A	A	A	A							
13								S	240	300	340	370	380	380	340	300	A	A							
14								S	260	A	345	365	A	A	A	A	A	A							
15								S	250	300	A	B	A	A	A	A	A	A							
16								S	240	310	A	A	380	365	345	A	A	A							
17								S	230	290	320	340	380	370	340	280	240	A							
18								S	250	295	320	350	A	350	320	A	A	A							
19								S	240	300	325	345	A	A	A	A	A	210							
20								S	240	300	340	A	370	A	A	A	C	C							
21								C	C	C	C	A	A	A	A	320	A	S							
22								S	210	290	320	340	A	A	A	A	260	A							
23								S	240	285	315	340	A	A	330	300	270	A							
24								S	230	280	305	325	A	A	A	310	260	A							
25								S	H	H	H	A	A	A	A	305	280	220							
26								S	200	H	280	320	A	A	A	A	A	A							
27								S	210	H	280	315	340	A	A	A	A	265	S						
28								S	H	200	280	310	A	A	350	335	A	H	275	190					
29								S	210	280	310	330	340	H	A	340	310	280	S						
30								S	195	H	280	A	B	360	360	350	320	270	A						
31								S	200	280	310	335	A	A	335	305	255	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									29	26	23	18	8	13	12	16	17	6							
MED									240	295	320	350	365	360	335	308	265	195							
UQ									245	300	340	365	380	365	340	312	275	210							
LQ									220	280	315	340	358	350	330	305	260	175							

DEC. 1982

F0E (0.01 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOES (0.1 MHz)

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

Station	YAMAGAWA							Lat.		Long		Sweep		MHz to		MHz in		20sec 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 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	33	37	37	39	G	J A 37	G	G	E S 16	J A 21	E S 16	E S 16	E S 16	E S 16	E S 16
2	E S 16	J A 21	E S 16	J A 22	E S 16	E S 16	E S 16	E S 16	G	G	37	40	38	J G 34	G	G	J A 41	22	23	J A 22	E S 16	22	E S 16	E S 16
3	E S 16	E S 16	23	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	38	42	47	J A 56	J A 78	G	J G 22	J A 22	J A 34	J A 26	J A 24	E S 16	J A 43	E S 16
4	E S 16	E S 16	E S 16	24	E S 16	E S 16	E S 16	E S 16	G	J A 34	J A 36	42	J A 54	J A 48	35	38	J A 38	J A 30	J A 28	J A 27	J A 21	J A 39	J A 32	J A 25
5	E S 16	21	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	32	G	J A 40	J A 41	J A 44	J A 50	G	G	J A 26	J A 32	J A 24	J A 23	E S 16	E S 16	22
6	E S 16	J A 20	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	27	J A 35	J A 41	J A 42	40	J A 43	J A 36	J A 32	G	G	J A 30	J A 20	23	20	E S 16	E S 16
7	E S 16	E S 16	J A 22	E S 16	E S 16	E S 16	E S 16	E S 16	26	35	J A 43	J A 43	J A 52	41	J A 41	J A 45	J A 39	J A 29	J A 20	J A 31	J A 28	22	E S 16	E S 16
8	E S 16	E S 16	J A 22	J A 30	E S 16	E S 16	E S 16	E S 16	G	E B 51	J A 59	J A 50	44	40	J A 48	G	G	J A 46	J A 30	E S 16	E S 16	J A 30	E S 16	E S 16
9	J A 26	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	28	G	39	41	J A 44	J A 44	J A 39	J A 34	G	G	22	J A 21	J A 30	J A 21	24	23
10	E S 16	E S 16	E S 16	E S 16	J A 33	J A 29	23	J A 24	J A 34	G	G	45	J A 50	J A 67	J A 51	J A 60	J A 47	J A 51	J A 32	22	E S 16	E S 16	E S 16	E S 16
11	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	40	43	45	43	J A 55	J A 42	43	J A 32	J A 45	J A 30	J A 65	J A 30	25	E S 16
12	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	J A 21	E S 16	G	G	J A 50	J A 53	J A 70	J A 80	J A 46	J A 45	J A 40	J A 50	J A 50	J A 30	J A 20	E S 16	22	E S 16
13	J A 25	J A 30	J A 21	22	J A 20	J A 20	J A 20	E S 16	G	G	G	G	J A 48	45	42	35	33	J A 30	J A 32	J A 25	E S 16	E S 16	E S 16	E S 16
14	E S 16	E S 16	J A 25	E S 16	E S 16	E S 16	E S 16	E S 16	J A 30	J A 44	G	G	J A 44	43	J A 40	J A 47	J A 50	J A 40	J A 30	J A 40	22	E S 16	E S 16	E S 16
15	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	42	E B 80	42	G	41	38	J A 32	J A 55	J A 30	J A 25	J A 25	22	E S 16	E S 16
16	23	E S 16	J A 20	E S 16	E S 16	E S 16	22	E S 16	G	41	45	J A 45	G	40	G	J A 33	J A 32	J A 40	J A 35	J A 30	J A 25	E S 16	E S 16	E S 16
17	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	35	44	J A 70	46	J A 68	38	J A 50	25	E S 16	E S 16	23	25	E S 16	E S 16
18	E S 16	J A 40	22	J A 25	J A 40	22	22	E S 16	G	G	38	J A 48	J A 87	J A 57	53	40	J A 84	J A 30	E S 16	E S 16	E S 16	E S 16	23	E S 16
19	E S 16	J A 21	E S 16	E S 16	J A 50	56	J A 42	J A 40	J A 25	36	J A 65	J A 114	J A 86	J A 180	J A 90	J A 146	J A 55	G	J A 30	J A 33	J A 30	J A 30	J A 30	22
20	E S 16	E S 16	J A 20	20	J A 34	J A 90	E S 16	E S 16	G	G	G	J A 40	G	42	J A 50	70	C	C	C	C	C	C	C	C
21	E C 28	C	C	C	C	C	C	E C 22	C	C	C	J A 50	45	J A 60	J A 57	26	J A 64	J A 20	21	J A 18	E S 16	E S 16	E S 16	20
22	J A 23	J A 30	J A 24	18	J A 18	E S 16	E S 16	E S 16	G	G	G	39	70	J A 52	J A 48	37	20	J A 35	J A 41	J A 34	J A 25	J A 23	E S 16	E S 16
23	E S 16	J A 24	22	E S 16	E B 13	25	J A 19	E S 16	G	G	G	J A 36	40	37	23	G	G	17	22	J A 24	23	20	E S 16	E S 16
24	22	21	J A 18	J A 24	E S 16	18	E S 16	E S 16	G	G	G	40	38	41	J A 47	23	30	J A 32	J A 24	J A 30	J A 26	E S 16	E S 16	E S 16
25	J A 20	J A 22	22	21	J A 22	J A 20	E S 16	20	23	J A 40	36	J A 44	J A 41	J A 39	J A 35	G	J A 33	23	J A 19	J A 20	J A 18	E S 16	20	21
26	20	E S 16	E S 16	20	J A 22	E S 16	23	E S 16	23	32	37	J A 42	J A 46	42	39	J A 38	60	J A 43	J A 36	J A 24	J A 24	J A 18	23	E S 16
27	E S 16	J A 20	E S 16	J A 29	J A 24	J A 29	23	23	G	G	G	G	J A 120	J A 52	J A 81	J A 42	J A 51	J A 36	J A 36	J A 33	22	20	22	20
28	E S 16	23	E S 16	23	E S 16	22	E S 16	E S 16	G	G	38	J A 50	J A 46	J A 39	G	J A 47	J G 23	20	J A 24	J A 24	24	J A 20	E S 16	J A 24
29	J A 40	21	J A 20	J A 20	J A 22	J A 20	23	E S 16	G	G	G	G	G	36	36	G	G	J A 29	J A 30	J A 38	J A 25	J A 24	23	21
30	21	18	E S 16	J A 24	E S 16	J A 21	23	E S 16	G	G	J A 43	E B 43	G	G	G	J A 60	G	J A 44	J A 36	J A 29	E S 16	23	23	23
31	E S 16	E S 16	E S 16	E S 15	E S 15	E S 16	22	E S 16	G	G	G	G	36	36	G	G	G	E S 16	E S 16	17	22	E S 15	E S 16	E S 16
CNT	31	30	30	30	30	30	30	31	30	30	30	31	31	31	31	31	30	30	30	30	30	30	30	30
MED	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	37	42	J A 44	43	J A 41	37	J 32	J A 30	J A 30	J A 24	J A 22	19	E S 16	E S 16
UQ	20	J A 21	J A 22	22	J A 22	21	22	E S 16	23	34	41	J A 44	J A 51	J A 50	J A 50	J A 44	J A 47	J A 40	J A 34	J A 30	J A 25	J A 23	23	21
LQ	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	G	40	40	39	36	G	G	22	J A 22	J A 20	E S 16	E S 16	E S 16	E S 16

DEC. 1982

FOES (0.1 MHz)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1982

FBES (0.1 MHz)

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

Station	YAMAGAWA																							Lat.	31 12' 1" N	Long	130 37' 1" E	Sweep	1	MHz to 20 MHz in 20sec 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 16	E S 16	E S 16	E S 16	E S 16	G	32	36	37	39	G	34	G	G	E S 16	19	E S 16	E S 16	E S 16	E S 16	E S 16																												
2	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	37	39	38	33	G	G	G	29	21	E	20	E S 16	E S 16	E S 16																												
3	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	37	42	45	54	66	G	G	21	18	20	24	20	E S 16	39	E S 16																											
4	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	31	35	41	44	44	35	38	28	28	26	24	18	39	27	24																												
5	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	31	G	37	38	38	36	G	G	20	E	20	E S 16	E S 16	E S 16	E																												
6	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	26	34	40	41	40	42	35	31	G	G	E	E	E	E	E S 16	E S 16																												
7	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	25	32	40	42	42	40	40	35	29	24	E	22	24	E S 16	E S 16	E S 16																												
8	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	E B 51	54	44	44	39	44	G	G	22	30	E S 16	E S 16	E S 16	E S 16	E S 16																												
9	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	26	G	37	41	44	42	37	33	G	G	E	18	21	E	E	E																												
10	E S 16	E S 16	E S 16	E S 16	A A 33	E	E	20	26	G	G	43	49	64	50	56	33	48	26	E	E S 16	E S 16	E S 16	E S 16																												
11	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	36	38	41	39	50	38	36	28	20	20	45	25	E S 16	E S 16																												
12	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	G	42	54	54	35	34	35	46	43	25	18	E S 16	E S 16	E S 16																												
13	19	25	17	E	E	E	E S 16	E S 16	G	G	G	G	42	41	38	31	29	22	29	E	E S 16	E S 16	E S 16	E S 16																												
14	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	26	31	G	G	36	38	35	40	30	24	E	30	E S 16	E S 16	E S 16																													
15	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	33	E B 80	38	G	36	34	29	32	E	20	19	E S 16	E S 16																													
16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	32	36	36	G	32	G	32	28	26	30	21	20	E S 16	E S 16	E S 16																												
17	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	G	40	40	40	40	32	45	20	E S 16	E S 16	E	21	E S 16	E S 16																												
18	E S 16	25	E	22	E	E	E S 16	E S 16	G	G	34	43	84	45	45	32	35	21	E S 16	E S 16	E S 16	E S 16	E S 16																													
19	E S 16	E S 16	E S 16	E S 16	25	A A 56	18	20	22	31	40	48	50	72	45	70	29	G	20	26	25	23	19	E																												
20	E S 16	E S 16	E	E	19	E S 16	E S 16	E S 16	G	G	G	38	G	36	48	64	C	C	C	C	C	C	C	C																												
21	E C 28	C	C	C	C	C	C	E C 22	C	C	C	40	41	45	33	25	26	G	E	E S 16	E S 16	E S 16	E																													
22	E	17	E	E	E S 16	E S 16	E S 16	E S 16	G	G	G	37	37	44	34	31	20	19	27	30	23	18	E S 16	E S 16																												
23	E S 16	17	E S 16	E B 13	19	16	E S 16	E S 16	G	G	G	36	39	37	23	G	17	G	21	E	E S 16	E S 16	E																													
24	E	E	E	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	G	39	36	37	36	22	G	23	21	26	E S 16	E S 16	E S 16																													
25	E	E	E	E	E	E	E S 16	G	18	G	G	40	35	35	35	G	G	18	E	E	17	E S 16	E	E																												
26	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	18	G	36	37	37	37	34	36	37	21	E	E	E	E	E S 16	E S 16																												
27	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	G	G	55	48	40	34	32	30	25	30	20	E	E	E																												
28	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	G	37	36	G	G	32	20	G	E	18	E	E S 16	E																													
29	20	E	E	E	E	E	E S 16	E S 16	G	G	G	G	G	35	G	G	G	G	19	25	19	E	E	E																												
30	E	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	33	E B 43	G	G	G	G	G	30	23	20	E S 16	E	E	E																												
31	E S 16	E S 16	E S 16	E S 15	E S 15	E S 16	E S 16	E S 16	G	G	G	G	33	35	G	G	G	E S 16	E S 16	E	E S 15	E S 16	E S 16	E S 16																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																												
CNT	31	30	30	30	30	30	30	31	30	30	30	31	31	31	31	31	30	30	30	30	30	30	30	30																												
MED	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	G	E G 33	38	39	39	35	32	27	21	19	20	16	16	E S 16	E S 16																												
UQ	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	18	31	36	42	44	44	40	34	30	26	25	24	20	E S 16	E S 16	E S 16																												
LQ	E S 16	E	E	E	E	E	E	E S 16	G	G	G	37	36	35	34	G	G	16	E	E	E	E	E	E																												

DEC. 1982

FBES (0.1 MHz)

IONOSPHERIC DATA

DEC. 1982

F-MIN (0.1 MHZ)

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

Station	YAMAGAWA							Lat.	31 12' 1 N			Long	130 37' 1 E			Sweep	1 MHz to 20 MHz		in 20sec 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 16	E S 16	E S 16	E S 16	E S 16	16	16	17	20	20	21	18	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
2	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	20	18	20	20	19	18	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
3	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	17	20	20	21	17	19	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
4	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	17	20	20	19	17	19	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
5	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	18	20	21	20	20	18	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
6	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	17	18	20	20	20	20	18	17	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
7	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	18	16	20	20	21	23	20	19	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
8	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	51	29	25	30	21	22	20	20	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
9	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	21	22	25	21	22	20	17	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
10	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	26	26	42	26	42	28	18	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
11	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	21	19	20	20	42	20	18	15	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
12	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	19	16	20	20	19	20	18	20	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
13	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	16	16	16	21	20	20	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
14	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	20	20	20	20	18	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
15	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	18	80	20	16	16	18	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	20	20	19	20	18	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
17	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	15	20	25	22	22	22	21	15	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
18	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	20	20	18	22	21	23	22	20	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
19	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	20	21	25	21	22	21	23	20	20	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
20	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	18	20	21	23	22	22	20	E C 30	C	C	C	C	C	C	C	C
21	E C 28	C	C	C	C	C	C	E C 22	E C 41	E C 52	E C 51	18	20	23	23	21	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
22	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	18	16	17	18	21	20	20	20	18	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16
23	E S 16	E S 16	E S 16	E S 16	13	17	14	E S 16	E S 16	16	17	18	20	20	20	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
24	E S 16	E S 16	E S 16	12	E S 16	E S 16	E S 16	E S 16	E S 16	17	16	16	17	17	20	18	16	13	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
25	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16	17	18	16	17	17	16	16	15	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
26	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	16	16	21	18	20	20	20	20	20	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
27	E S 16	E S 16	E S 16	12	E S 16	E S 16	E S 15	E S 14	19	20	17	16	20	20	20	19	16	E S 16	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16
28	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	17	18	20	22	17	16	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
29	E S 16	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	16	16	17	20	22	21	17	20	E S 16	E S 16	14	E S 15	E S 16	E S 16	E S 16
30	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	17	43	24	23	23	17	17	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16
31	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	16	17	17	18	21	18	17	15	15	E S 16	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30	30	30
MED	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	18	20	20	20	20	18	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
UQ	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	20	22	21	22	22	20	18	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
LQ	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	17	18	20	20	18	17	16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16

DEC. 1982

F-MIN (0.1 MHZ)

### IONOSPHERIC DATA

DEC. 1982

M(3000)F2 (0.01)

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

Station		YAMAGAWA										Lat. 31 12.1 N		Long 130 37.1 E		Sweep 1 MHz to 20 MHz in 20sec 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	270	275	335	385	325	270	280	295	330	330	325	325	305	305	305	320	315	330	290	315	315	295	310	275	
2	280	285	275	310	335	340	290	300	355	355	345	340	330	305	315	320	320	340	335	320	295	310	350	270	
3	275	275	335	360	365	340	270	305	335	340	350	335	325	300	310	325	315	325	310	290	290	320	335	280	
4	265	255	280	290	325	295	285	315	320	320	305	320	295	295	285	295	295	320	310	280	295	285	290	300	
5	270	270	275	280	270	285	295	325	345	315	300	305	285	280	295	255	300	300	315	310	295	300	285	280	
6	295	300	295	280	305	305	310	325	335	330	335	310	295	305	305	315	325	305	310	310	315	325	310	265	
7	285	270	275	285	325	280	310	335	350	345	330	310	300	300	290	300	300	295	310	320	275	280	245	240	
8	230	230	240	235	260	250	285	310	315	305	300	305	310	295	300	295	295	305	285	305	325	295	280	285	
9	275	320 <sup>S</sup>	270	270	250	270	285	265	325	320	315	300	280	285	280	275	290	295	290	290	285	285	285	290	
10	250	250	335	340	A	280	280	305	340	335	330	295	300	295	280	290	300	305	290	290	260	230	285	255	
11	255	265	250	235	255	245	275	310	315	295	285	280	280	275	285	260	290	285	305	285	285	295	285	280	
12	325	290	225	240	265	240	240	280	295	300	300	295	275	275	275	270	265	270	285	290	290	275	285	245	
13	265	255	310	270	275	270	230	280	320	330	320	315	285	295	290	285	320	305	310	295	275	280	290	270	
14	250	F	275	250	265	260	295	305	315	305	310	305	290	280	280	280	285	295	280	305	260	280	280	255	
15	260	260	295	300	325	265	275	285	310	325	320	280	290	275	280	275	305	285	270	300	280	270	285	275	
16	265	290	290	295	290	275	270	290	315	315	310	310	275	270	275	280	280	300	290	295	310	300	260	245	
17	250	265	265	255	270	250	250	265	300	285	280	280	280	280	270	265	285	275	290	300	240	265	265	245	
18	250	250	295	265	255	265	230	265	325	315	310	305	295	305	295	290	290	310	290	290	320	270	255	270	
19	295	260	265	285	310	A	F	260	295	315	305	300	290	285	285	280	300	295	295	300	300	310	240	240	
20	265	290	305	270	260	250	270	305	320	315	315	305	300	300	290	I c 290	c	c	c	c	c	c	c	c	
21	c 285	c	c	c	c	c	c	285	c	c	c	325	315	310	310	315	290	310	320	310	275	300	325	290	
22	280	245	255	290	310	265	305	300	340	325	330	310	300	300	290	300	295	320	310	295	335	265 <sup>S</sup>	260	250	
23	270	250	250	270 <sup>S</sup>	360	225	265	305	345	330	340	335	325	315	305	315	300 <sup>H</sup>	315	310	295 <sup>S</sup>	270	300	325	250	
24	270	250	275	255	250	245	275	310	315	325	325	320	300	295	315	315	305	310	300	265	315	315	305	235	
25	275	310	280	260	260	255	290	290	325 <sup>S</sup>	320	340	345	315	325	320	315	320	310	300	275 <sup>H</sup>	290	300 <sup>S</sup>	325 <sup>S</sup>	265	
26	230	250 <sup>S</sup>	265	280	305	265	305 <sup>S</sup>	310	355	380	335	340	315	310	320	315	295	320	290	295	305	295	310	255	
27	260	255	295	285	285	285	280	270	340 <sup>S</sup>	335	315	320	300	290	305	300	285 <sup>H</sup>	285	280	J S 250	265	275 <sup>S</sup>	250 <sup>S</sup>	230 <sup>S</sup>	
28	220	245 <sup>S</sup>	285 <sup>H</sup>	295	305	285	280	290	340	330	335	325	305	295	300	310	320	320	300	290	280	330	290	285	
29	255	255	280	285	285	330	275	270	325	355	310	280	300	290 <sup>H</sup>	290	300	280	290	280	300	310 <sup>S</sup>	240	285	300	
30	255	265	250	305	355	275	295	300	330	350	315	325	320	295	295	305	315	305	290	320	325	305	280	265	
31	290	285	280	260	285	295	315	305	330	335	305	330	320	310	285	310	285	275 <sup>S</sup>	285	325	245 <sup>H</sup>	280	285	290	
	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	29	30	30	29	29	29	31	30	30	30	31	31	31	31	31	30	30	30	30	30	30	30	30	
MED	265	265	278	280	285	270	280	300	325	325	315	310	300	295	290	300	298	305	292	295	290	295	285	268	
UQ	278	285	295	295	325	285	295	308	340	335	330	325	312	305	305	315	315	315	310	310	310	300	310	280	
LQ	255	250	265	260	265	255	270	282	315	315	305	302	290	285	285	280	290	295	290	290	275	275	280	250	

DEC. 1982

M(3000)F2 (0.01)

# IONOSPHERIC DATA

DEC. 1982

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station		YAMAGAWA											Lat. 31° 12' N		Long. 130° 37' E		Sweep 1		MHz to 20		MHz in 20sec		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									
2											L	L	L	L	L	L	L								
3												L	L	L	L	A	L								
4												L	L	L	L	L	L								
5													L	L	L	L	L								
6													L	L	L	L	L								
7												L	L	L	L	L	L								
8												L	L	L	L	L									
9												L	L	L	L	L	L	L							
10													L	L	L	L	L								
11										L	L	L	L	L	L	L	L	L	L						
12										L	L	L	L	L	L	L	L	L	L						
13										L	L	L	L	L	L	L	L	L	L						
14										L	L	L	L	L	L	L	L	L	L						
15										L	L	L	B	L	L	L	L	L	L						
16										L	L	L	L	L	L	L	L	L	L						
17											L	L	L	L	L	L	L	L	L						
18										L	L	L	L	A	L	L	L	L							
19										L	L	L	L	L	A	L	A	L	L						
20										L	L	L	L	L	L	L	L	C	C						
21										C	C	C	L	L	L	L			L						
22											L	L	L	L	L	L	L								
23												L	L	L	L	L									
24												L	L	L	L	L	L								
25												L	L		L	L									
26											L	L	L	L	L	L									
27												L	L	A	L	L									
28												L		L	L	L	L								
29												L	L	L	L	L	L								
30													L	L	L	L	L								
31												L	L	L	L	L									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																									
MED																									
UQ																									
LQ																									

DEC. 1982

M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F2 (KM)

135° E Mean Time (G.M.T. + 9 h)

Station **YAMAGAWA** Lat. **31 12.1 N** Long **130 37.1 E** Sweep **1** MHz to **20** MHz in **20** 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	240	315	290	270									
2										240	230	240	250	300	240	270								
3											240	230	250	300	270	250								
4											265	250	280	295	300	275								
5												265	295	290	280	290								
6													275	320	280	275	255							
7												250	270	290	270	290	265							
8												300	250	245	275	300								
9												245	260	310	310	310	320	270						
10													270	290	280	320	315							
11										270	270	280	290	270	280	290	330	280	250					
12										260	280	260	250	280	290	280	290	260	270					
13										260	250	250	270	260	260	260	280	250	260					
14										260	260	240	260	290	270	250	280	260	250					
15										270	250	250	B	290	280	280	250	250	240					
16										270	250	250	250	280	280	290	260	260	240					
17											280	260	270	260	290	280	290	280	280					
18										240	240	260	250	A	250	270	250	260						
19										260	250	250	260	260	A	260	A	260	240					
20										240	250	240	260	250	260	280	280		C	C				
21										C	C	C		235	245	245	260			250				
22											250	250	240	250	260	250	255	255						
23												230	245	240	260	275	245							
24												255	255	275	275	230	255	250						
25												235	245		235	240								
26											240	225	240	250	245	250								
27												245	255	245	295	275								
28												235		250	295	275	255							
29													270	245	255	260	280	265						
30													235	235	245	255	250							
31													260	255	245	260	240							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										9	13	26	29	29	30	31	23	12	9					
MED										260	250	250	250	260	278	275	265	260	250					
UQ										270	260	260	260	290	290	280	285	265	260					
LQ										260	250	240	245	250	260	258	255	252	240					

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H<sup>o</sup>F2 (KM)



# IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		YAMAGAWA											Lat. 31 12.1 N, Long. 130 37.1 E											Sweep 1 MHz to 20 MHz in 20sec in automatic operation										
Hour	Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23									
1		300	E S 330	250	210	250	E S 370	E S 360	275	180	H	240	240	240	220	H	H	230	210	H	H	180	225	200	240	220	225	255	E S 290					
2		300	305	300	280	255	250	E S 350	H	H	H	230	240	230	230	230	220	H	250	225	200	220	200	240	220	225	255	E S 325						
3		E S 350	325	250	220	235	E S 330	E S 360	275	190	H	200	240	240	240	A	A	190	H	240	200	H	210	E A 250	250	240	E A 260	250						
4		E S 300	E S 305	E S 320	E S 295	245	275	E S 300	250	190	H	240	240	245	250	245	225	250	240	240	220	220	E A 250	E A 280	250	E A 275								
5		E S 340	E S 340	320	E S 330	E S 320	E S 300	270	250	225	245	230	245	220	H	240	240	240	190	H	245	240	220	205	225	240	E S 280							
6		260	E S 290	E S 295	300	270	E S 260	E S 290	250	230	230	240	235	230	H	240	240	245	245	220	210	245	230	225	230	E S 280								
7		E S 300	E S 325	E S 320	E S 315	270	280	280	240	230	235	240	245	240	245	235	245	245	245	230	195	250	220	240	E S 310	E S 380								
8		E S 370	E S 355	340	E A 350	E S 330	350	240	205	H	H	260	A	A	A	245	240	245	245	235	225	250	210	225	E S 290	E S 290								
9		E S 330	290	E S 310	E S 370	E S 390	E S 370	290	310	245	245	230	240	245	230	250	240	250	230	200	220	240	225	270	270									
10		E S 305	E S 380	240	230	A	E S 350	E S 330	275	240	240	240	240	250	A	245	A	250	235	230	240	280	260	230	E S 270									
11		280	280	290	E S 350	270	290	240	220	240	240	240	240	230	240	A	260	240	240	240	220	250	E A 290	240	240	260								
12		260	260	E S 360	E S 400	280	360	350	270	240	240	240	240	A	E A 260	E A 260	220	240	240	240	240	220	220	200	220	290								
13		270	260	240	280	290	280	300	290	240	240	240	230	240	230	240	240	240	220	230	230	240	240	230	260									
14		320	320	280	320	310	310	265	250	240	240	230	230	230	220	220	240	240	240	240	200	240	200	220	220	250								
15		290	290	260	230	220	280	310	280	240	240	240	B	220	230	240	230	230	230	220	240	240	240	230	240									
16		300	280	280	270	260	260	300	270	240	240	220	240	200	230	220	240	230	230	220	240	210	260	280	E S 330									
17		E S 350	300	300	320	280	E S 360	E S 380	290	240	240	220	240	240	230	240	240	250	A	230	240	220	250	260	220	260								
18		E S 350	310	240	230	290	290	E S 350	320	230	220	240	240	A	230	240	230	240	240	210	260	240	250	220	230									
19		260	330	330	265	320	A	330	300	250	240	240	A	A	A	A	A	240	220	220	240	250	230	340	340									
20		280	220	210	260	E S 450	E S 380	330	270	230	240	230	220	230	230	240	A	C	C	C	C	C	C	C	C									
21		E C 285	C	C	C	C	C	C	285	E C 245	250	240	230	A	A	245	H	240	H	H	215	205	220	235	260	225	220							
22		300	350	340	280	260	290	275	240	230	225	240	235	200	245	225	240	225	215	215	275	235	245	215	230									
23		335	365	395	295	205	S	400	275	240	235	H	235	245	225	235	H	225	240	230	220	205	200	210	225	235	315							
24		320	305	310	305	345	365	300	265	250	245	H	245	240	225	225	H	235	225	225	225	200	275	245	220	210	325							
25		300	245	285	305	315	350	325	295	245	245	235	235	225	H	225	H	H	245	H	225	200	220	245	210	230	230							
26		345	315	285	280	255	325	290	285	245	240	225	220	H	230	225	225	225	H	230	220	210	220	220	225	230	260							
27		300	300	260	280	260	295	325	280	230	210	H	200	245	A	H	H	260	255	H	225	225	210	235	245	225	210	245						
28		300	275	245	255	245	295	300	275	225	235	235	H	220	H	210	215	245	245	225	210	230	255	225	245	265								
29		E A 350	345	295	270	275	225	340	305	245	215	210	H	245	230	225	H	235	240	220	205	235	210	235	240	230								
30		295	345	350	260	215	315	300	295	230	225	H	225	B	225	230	230	240	245	230	220	230	220	215	260	295								
31		275	275	295	320	295	275	245	245	225	215	H	200	H	240	230	205	225	H	H	205	250	235	200	235	250	255							
CNT		31	30	30	30	29	28	30	31	31	31	30	28	28	28	30	28	30	30	30	30	30	30	30	30	30								
MED		288	295	282	271	265	289	292	275	235	240	238	240	230	230	232	240	240	225	210	235	230	230	231	U 255									
UQ		U 316	322	310	U 300	U 295	U 330	325	288	240	240	240	240	240	240	240	240	245	235	220	242	245	240	250	E S 290									
LQ		283	278	255	260	255	280	282	250	228	228	230	235	225	225	225	230	230	220	205	220	210	225	220	250									

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H<sup>o</sup>F (KM)

The Radio Research Laboratories, Japan

### IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>E (KM)

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

Station	YAMAGAWA																							
	Lat. 31 12.1 N												Long 130 37.1 E											
	Sweep 1 MHz to 20 MHz in 20sec 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	120	115	110	110	110	115	115	115	120							S
2								S	120	120	115	110	110	115	115	115		A	E	S				
3								S	125	115	110	115	115	110	110	120		A		A				
4								S	120	120	115	110	110	110	110	115		A		S				
5								S	125	115	115	115	115	115		A	110	115						S
6								S	125	115	115	115	115	115	115	115	120		E	S				
7								S	125	115	115	115	115	115	115	115		A		S				
8								S	120	B	120	120	120	120	120	120	120							S
9								S	120	120	115	115	120	115	115		A	115	E	S				
10								S	A		115	120	120		B	120			A	S				
11								S	120	110	110	110	110	110		B	110	110		A				
12								S	120	110	110	110	110	110	110			A	A	A				
13								S	110	110	110	110	110	110	110	110			A	A				
14								S	115	A	110	110		A	A	A	A	A	A	A				
15								S	110	110		A	B	A		110		A	A	A	A			
16								S	110	110	110		A	110	115	110		A	A	A				
17								S	110	110	110	110	110	110	110	110	110	110		A				
18								S	110	110	110	110	110	110	110			A	A	A				
19								S	115	110	110	110	110	110	110			A	A	E	S			
20								S	110	110	110		A	110		110		A	C	C				
21								C	C	C	C	110	110	110	110		E	A		S				
22								S	E	B	H	H	115	115	110		E	A		A				
23								S	125	115	115	115	115	115	115	115	125							
24								S	E	S	125	115	110	110	105	105	110		E	A	E	A		A
25								S	E	A	125	120	115	110	110	110	110	110	115	130				
26								S	A	125	115	110	110	115	115	115	115		A		A			
27								S	E	B	130	120	115	115	115	115		H	A		E	A		S
28								S	E	S	130	115	110	110	110	115	115		A	E	A	E	A	
29								S	120	115	110	110	115	120	120	110	125							S
30								S	125	115	115		B	120	120	115	110	110						A
31								S	120	115	115	115	115	115	115	115	120							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									29	28	29	27	28	29	25	20	16	6						
MED									120	115	110	110	110	115	112	115	118	E	S					
UQ									122	115	115	115	115	115	115	116	122	E	S					
LQ									115	110	110	110	110	110	110	110	115	E	A					

DEC. 1982

H<sup>o</sup>E (KM)

# IONOSPHERIC DATA

DEC. 1982

H<sup>°</sup>ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station Hour Day	YAMAGAWA										Lat. 31° 12' N		Long 130° 37' E		Sweep 1 MHz to 20 MHz in 20 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	S	S	S	S	S	S	S	G	175	150	150	155	G	120	G	G	S	110	S	S	S	S	S								
2	S	110	S	105	S	S	S	S	G	G	150	140	145	120	G	G	105	160	105	125	S	125	S	S								
3	S	S	110	S	S	S	S	S	G	G	170	145	140	130	125	G	105	110	100	105	100	S	110	S								
4	S	S	S	105	S	S	S	S	G	125	125	145	130	140	150	170	105	120	130	120	110	105	105	100								
5	S	100	S	S	105	S	S	S	G	140	G	125	125	125	105	G	G	100	100	100	100	S	S	105								
6	S	100	S	S	S	S	S	S	S	160	125	120	120	120	120	120	120	G	G	105	100	100	100	S	S							
7	S	S	105	S	S	S	S	S	S	140	140	125	125	120	120	110	110	105	105	105	100	105	105	S	S							
8	S	S	105	105	S	S	S	S	G	B	125	120	120	120	115	G	G	110	110	S	S	120	S	S								
9	115	S	S	S	S	S	S	S	S	125	G	140	125	120	120	125	110	G	G	100	100	100	100	100								
10	S	S	S	S	100	100	105	105	100	G	G	125	125	120	115	110	105	100	100	105	S	S	S	S								
11	S	S	S	S	S	S	S	S	S	G	G	130	130	120	130	130	120	120	110	110	100	100	100	100	S							
12	S	S	S	S	S	S	S	S	S	G	G	120	130	120	120	115	110	110	110	110	100	100	S	100	S							
13	110	110	110	110	110	110	100	S	G	E	G	G	130	130	120	120	100	100	100	100	S	S	S	S								
14	S	S	110	S	S	S	S	S	S	100	110	G	G	110	110	110	110	100	110	100	100	S	S	S								
15	S	S	S	S	S	S	S	S	S	G	G	110	B	110	G	110	110	100	110	100	100	110	S	S								
16	110	S	110	S	S	S	110	S	G	130	120	110	G	110	G	100	110	100	100	100	100	S	S	S								
17	S	S	S	S	S	S	S	S	S	G	G	130	120	120	130	120	120	115	110	S	S	110	110	S	S							
18	S	110	110	110	110	110	110	S	G	G	130	125	120	120	120	110	110	110	S	S	S	S	100	S								
19	S	110	S	S	110	110	110	100	130	130	120	120	115	115	110	110	G	100	100	100	100	100	100	100								
20	S	S	110	110	110	110	S	S	G	G	G	110	G	110	115	110	C	C	C	C	C	C	C	C								
21	C	C	C	C	C	C	C	C	C	C	C	125	120	120	115	105	110	105	105	95	S	S	S	115								
22	120	110	105	110	110	S	S	S	G	G	G	125	110	110	125	115	105	105	100	95	100	100	S	S								
23	S	110	110	S	B	110	105	S	G	G	G	125	125	125	110	G	105	100	100	100	100	S	S	100								
24	100	110	110	105	S	110	S	S	G	G	G	135	140	125	115	100	150	95	95	95	95	S	S	S								
25	105	100	105	105	100	100	S	100	110	100	130	125	120	115	125	G	105	105	100	100	95	S	95	95								
26	100	S	S	105	105	S	105	S	100	155	140	125	125	125	120	115	110	105	105	105	100	95	100	S								
27	S	120	S	105	105	100	100	100	G	G	G	G	120	120	115	100	145	100	100	100	100	100	130	100	100							
28	S	110	S	100	S	100	S	S	G	G	145	120	120	120	G	105	100	100	100	100	100	100	S	125								
29	100	105	105	100	100	100	100	S	G	G	G	G	G	125	125	G	G	105	100	100	100	100	100	100								
30	95	100	S	115	S	105	105	S	G	G	120	B	G	G	G	120	G	100	100	100	S	100	100	100								
31	S	S	S	S	S	S	105	S	G	G	G	G	120	115	G	G	G	S	S	130	120	S	S	S								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23								
CNT	9	14	13	14	11	12	12	4	8	10	19	24	27	28	26	22	22	25	27	26	22	16	12	11								
MED	105	110	110	105	105	108	105	102	105	130	130	125	120	120	118	110	110	105	100	100	100	100	100	100								
UQ	110	110	110	110	110	110	110	108	132	140	140	130	125	125	125	120	110	110	108	100	100	110	100	102								
LQ	100	100	105	105	102	100	102	100	100	125	122	120	120	118	115	110	105	100	100	100	100	100	100	100								

DEC. 1982

H<sup>°</sup>ES (KM)

# IONOSPHERIC DATA

DEC. 1982      TYPES OF ES

135° E Mean Time (G.M.T. + 9 h)

Station	YAMAGAWA																								
Lat.	31 12' 1" N												Long 130 37' 1" E												
Sweep	1 MHz to 20 MHz in 20sec 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									H2	H2	H2	HC12			C2					F3					
2		F2		F2							H2	H3	H2	C1			L3	H2	F1	F5		F1			
3			F2							H2	H1	HC32	H3	C6			L3	L3	F4	F3	F2		F6		
4				F2					C2	C2	H2	H4	HC22	H1	H2	L3	C5	F5	F4	F3	F7	F6	F4		
5		F1			F4				H2		C1	C1	C2	L2			L3	F2	F4	F3			F1		
6		F2							H2	C3	C3	C2	C2	C2	C2	C1			F1	F2	F2	F2			
7			F2						H2	H2	C3	C2	C2	C2	C3	C4	L3	L3	F1	F3	F4	F2			
8			F2	F4						C2	C2	C1	C1	C1	C2			L3	F6			F1			
9	F2								C3		HC11	C2	C1	C2	C1	L2			F1	F4	F4	F3	F2	F1	
10					F7	F3	F3	L3	L3			C1	C1	C3	L1	C2	F3	L3	F5	F2					
11										H1	H1	C1	H1	H1	C2	C5	L3	F5	F3	F5	F5	F2			
12						F3					C1	H3	C4	C4	C2	L3	L3	L4	F4	F5	F2		F1		
13	F3	F6	F3	F2	F1	F2	F2						H1	H1	C1	C1	L2	L2	F3	F2					
14			F1						L1	L1			L2	L1	L2	L3	L3	L3	F4	F4	F1				
15											L2		L1		L2	L3	L3	L4	F2	F3	F3	F1			
16	F1		F1				F1			H2	C3	L2		L2		L2	L4	L3	F4	F4	F2				
17											H1	C1	CH11	H1	C1	C2	C5	L1			F1	F3			
18		F5	F1	F5	F3	F1	F1			H1	H3	C6	C3	C4	L2	L3	L2						F2		
19		F1			F3	F5	F2	L4	L2	H1	H3	C3	C3	C3	C3	L3	L2		F2	F3	F3	F2	F2	F1	
20			F1	F1	F4	F2						L2		L2	C3	L2									
21												C2	C2	C3	C2	L1	L2	L1	F1	F3				F1	
22	F1	F4	F3	F1	F2							C2	C1	C3	CL12	L2	L1	L4	F5	F6	F4	F2			
23		F3	F1			F1	F2					C1	C2	C2	L1		L1	L1	F4	F1	F2			F2	
24	F1	F1	F1	F2		F1					H3	HC11	CL21	C3	L1	HL21	L4	F2	F3	F2					
25	F2	F3	F2	F2	F3	F2		L1	L1	L1	H1	C3	C1	C1	C2		L1	L1	F1	F1	F1		F2	F2	
26	F1			F1	F1		F1		L1	H2	H2	C1	C1	C2	C1	C2	L3	L3	F1	F2	F2	F2	F1		
27		F1		F2	F2	F2	F1	L1					C2	C3	CL32	L3	HL13	L3	F3	F6	F4	FF21	F1	F1	
28		F2		F1		F1				H2	C1	C1	C1		L2	L1	L1	F1	F1	F2	F2			FF11	
29	F4	F2	F1	F2	F2	F1	F1							C1	C1			L1	F2	F5	F4	F3	F1	F1	
30	F2	F1		F1		F2	F1				C1					C1		L4	F3	F2		F1	F1	F1	
31							F1							C1	C2						F1	F1			
	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																									

DEC. 1982      TYPES OF ES

# IONOSPHERIC DATA

DEC. 1982

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA							Lat.	26 16.9 N				Long	127 48.4 E				Sweep	1 MHz to 25 MHz		in 25sec 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 87	X 77	X 87	X 62	X 37	X 34	X 37											U 159	S 145	S 141	U 131	S 110	S 94	
2	X 83	X 83	X 74	X 63	X 49	X 44	X 38											X 129	X 126	S 122	X 110	X 96	X 75	
3	S 65	X 68	X 82	X 68	X 40	H 30	X 33											X 149	S 129	U 136	S 130	X 116	X 86	
4	H 64	X 56	X 66	X 73	X 73	H 47	X 54											X 170	X 146	X 123	X 116	X 106	X 86	
5	H 67	X 60	X 59	X 64	X 65	X 56	X 56											X 172	S 155	S 147	S 123	U 110	H 92	
6	S 90	X 75	X 67	H 56	X 55	X 48	H 32											X 172	S 151	S 151	U 138	S 91	X 70	
7	X 59	X 60	X 67	X 70	X 69	X 59	X 50											X 184	S 157	S 173	X 145	S 118	X 106	
8	S 101	S 100	S 95	S 99	X 91	X 108	X 106											X 126	S 101	X 109	X 96	H 83	X 70	
9	X 61	X 66	X 64	X 48	X 47	X 53	X 62											X 193	X 176	X 167	S 154	S 124	S 99	
10	X 78	X 69	X 83	X 55	X 27	H 28	A											C	X 198	U 159	X 149	X 123	X 93	
11	X 78	X 76	X 70	X 67	X 65	H 57	X 80											X 115	X 93	X 89	X 94	X 87	X 74	
12	X 65	X 65	H 58	X 50	X 54	H 47	X 51	X 79										X 190	X 190	S 183	X 179	X 169	S 135	
13	X 130	X 127	X 104	X 76	X 64	X 55	X 49	X 67										X 114	X 98	X 93	X 91	X 89	X 64	
14	X 46	X 50	X 43	X 38	X 36	X 38	X 43	X 67										X 176	X 171	X 177	X 175	X 159	S 135	
15	S 119	X 104	X 98	X 95	X 62	X 42	X 36	X 59										X 149	X 150	X 133	X 116	X 93	X 75	
16	X 60	X 63	X 70	X 76	X 65	X 43	X 44	X 64										X 166	X 155	X 143	X 110	X 90	X 82	
17	X 73	X 75	X 74	X 65	X 58	X 48	X 50	X 77										X 193	X 187	S 156	X 160	X 124	X 95	
18	X 91	X 117	X 124	X 75	X 76	X 71	X 71	X 88										X 138	U 142	U 171	U 166	X 145	H 82	
19	X 63	X 63	X 66	X 69	X 52	X 52	X 51	X 75										U 156	U 153	X 129	S 119	X 112	U 124	
20	X 115	X 97	X 87	X 69	X 48	X 50	X 56	X 83										X 181	X 172	X 185	S 176	U 156	180	
21	155	138	S 83	U 76	95	114	95	117										X 145	S 141	U 166	S 156	X 142	U 100	
22	S 75	X 62	X 70	X 72	X 65	X 56	X 51	X 75										X 142	S 113	S 82	H 81	X 94	H 81	
23	X 57	X 50	X 55	X 91	X 85	H 48	H 48	X 56										S 194	X 184	S 154	U 139	X 131	S 95	
24	H 80	H 92	S 62	X 59	X 56	H 65	X 70	X 91										X 123	H 90	X 91	X 94	X 82	H 64	
25	X 61	X 67	X 56	X 50	X 44	X 41	X 41	X 52										X 190	X 177	X 174	S 197	S 153	X 130	
26	U 102	S 93	X 92	X 67	57	52	67	73										X 139	X 143	X 149	X 150	X 122	H 94	
27	X 77	X 68	X 65	X 48	X 45	X 44	X 43	X 61										X 200	X 180	X 187	X 206	X 183	203	
28	170	160	X 105	X 83	X 66	X 50	X 47	X 67										X 108	U 99	S 98	X 113	X 83	X 53	
29	X 46	X 47	X 51	X 48	X 44	X 34	X 34	X 46										X 163	X 165	X 154	X 129	X 106	X 79	
30	X 56	X 57	X 58	X 68	X 54	X 40	X 41	X 53										U 126	X 114	X 103	X 90	X 57	X 49	
31	X 56	X 55	X 48	X 42	X 37	X 38	X 37	X 48										X 126	X 127	X 134	X 110	X 72	X 63	
	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	30	20											30	31	31	31	31	31
MED	X 75	X 68	X 70	X 67	X 56	X 48	X 50	X 67											X 158	X 150	X 147	X 130	X 110	X 86
UQ	X 90	X 92	X 85	X 74	X 65	X 56	X 56	X 78											X 181	X 172	166	155	128	100
LQ	X 61	X 61	X 60	X 56	X 46	X 42	X 41	X 58											X 129	X 126	X 122	X 110	X 90	X 74

DEC. 1982

FXI (0.1 MHz)

IONOSPHERIC DATA

DEC. 1982

FOF2 (0.1 MHz)

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

Station	OKINAWA																							
	Lat. 26 16' 9" N												Long. 127 48' 4" E											
	Sweep 1 MHz to 25 MHz in 25sec 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	81	71	81	56	31	28	31	57	103	142	U R 154	146	144	160	162	155	U R 155	152	U S 153	U S 139	135	U S 125	U S 104	U S 88
2	77	77	68	57	43	38	32	58	100	134	133	122	142	150	161	152	144	133	123	120	116	U S 104	90	S 69
3	59	62	76	62	34	H 24	27	52	94	127	130	129	127	140	164	164	157	145	143	123	S 130	124	110	80
4	H 58	50	60	67	67	H 41	48	S 75	113	137	147	144	163	179	187	190	177	170	164	140	117	110	S 100	80
5	S 61	54	53	58	59	50	50	69	94	109	118	136	132	145	157	159	164	162	166	149	S 141	U S 117	U S 104	U S 86
6	U S 84	69	S 61	S 50	49	42	H 26	57	107	112	124	115	137	142	146	155	156	R 162	S 166	S 145	S 145	S 132	S 85	64
7	53	54	S 61	U S 64	U S 63	53	44	64	95	113	127	118	136	157	162	177	179	R 195	178	151	167	139	112	U S 100
8	95	94	89	93	85	102	S 100	S 103	93	115	146	158	136	133	131	128	127	135	120	95	S 103	90	H 77	S 64
9	55	60	58	42	41	47	56	66	138	181	178	U R 185	R 192	197	202	R 202	U R 203	U R 196	S 187	170	161	S 148	S 118	S 93
10	72	S 63	77	49	21	22	A	58	110	131	132	135	144	157	163	168	172	R 179	C	U S 192	S 153	143	117	S 87
11	72	70	64	S 61	59	H 51	S 74	83	109	118	122	141	154	140	124	123	122	117	109	87	83	88	81	68
12	59	59	S 52	44	48	H 41	45	S 73	101	138	164	159	156	171	181	186	R 183	180	184	184	177	173	163	129
13	124	121	S 98	70	58	49	43	61	115	142	142	126	129	123	120	118	126	111	108	92	U S 87	85	83	58
14	40	44	37	32	30	32	37	61	S 98	135	166	142	154	R 170	R 174	168	170	169	170	165	171	169	S 153	S 129
15	113	S 98	92	89	56	36	30	53	95	131	146	B	147	173	187	194	179	164	143	144	127	110	87	69
16	54	57	64	70	59	37	38	58	102	138	145	146	152	187	187	177	169	171	160	149	137	104	84	S 76
17	67	69	68	59	52	42	44	71	107	131	159	159	174	180	176	171	170	169	187	181	150	154	118	89
18	85	111	118	69	70	65	65	82	160	124	133	143	155	147	130	123	137	143	132	S 136	S 165	U S 160	139	H 76
19	57	57	60	63	46	46	45	69	126	142	161	U R 180	174	164	162	162	162	165	150	147	S 123	113	S 106	S 118
20	109	91	81	S 63	42	44	50	77	131	150	168	141	161	161	168	172	R 180	R 182	175	166	179	S 170	S 150	F
21	F	F	U S 77	U S 70	F	F	F	F	U S 132	161	165	142	133	146	138	149	149	160	139	U S 135	U S 160	150	S 136	U S 94
22	69	56	64	66	59	50	45	69	H 105	126	135	129	144	130	148	129	125	128	136	U S 107	S 76	75	88	U S 75
23	51	44	49	U S 85	H 79	U S 42	U S 42	50	93	123	128	111	114	132	150	155	161	177	U S 188	178	148	133	U S 125	J S 89
24	J S 74	J S 86	S 56	S 53	50	H 59	64	S 85	128	149	166	137	140	142	155	142	134	132	117	U S 84	85	88	76	H 58
25	55	61	H 50	44	38	35	35	46	106	138	154	145	141	144	146	139	157	177	184	S 171	S 168	J S 191	147	124
26	S 96	U S 87	S 86	H 61	51	46	F	F 63	112	147	154	113	R 117	126	136	138	133	140	133	137	143	S 144	116	U S 88
27	S 71	62	59	42	39	38	37	55	110	130	133	127	145	151	154	168	186	193	S 194	174	181	200	177	F
28	F	F	S 99	77	60	44	41	61	104	110	128	121	101	114	123	133	130	105	102	93	92	107	77	47
29	40	41	J S 45	42	38	28	28	40	U S 117	115	120	S 152	R 174	170	168	171	U R 170	175	U S 157	159	148	123	S 100	73
30	50	51	52	62	48	34	35	47	110	109	117	132	135	125	125	128	134	139	U S 120	108	S 97	84	51	43
31	50	49	42	36	31	32	31	42	92	108	113	133	157	158	R 170	169	171	152	S 120	121	128	U S 104	66	57
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	31	31	30	30	28	30	31	31	31	30	31	31	31	31	31	31	31	30	31	31	31	29
MED	67	62	64	61	50	42	42	61	107	131	142	139	144	150	161	159	161	162	152	144	141	124	104	80
UQ	81	77	79	68	59	49	49	71	114	140	156	146	156	167	169	171	172	176	175	166	160	149	122	S 89
LQ	55	54	54	50	39	35	34	55	99	116	128	127	136	140	142	138	136	140	123	120	116	104	84	68

DEC. 1982

FOF2 (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA																							
Lat.	26 16.9 N												Long 127 48.4 E											
Sweep 1	MHz to 25 MHz in 25 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								
2													L	L	L	L								
3													L	L	L	L								
4													L	L	L	L	L							
5													L	L	L	L	L							
6													L	L	L	L	L							
7														L	L	L	L							
8												L		L	L	L	L							
9													L	L	L	L	L	L						
10														L	L	L	L							
11													L	L	L	L	L							
12														L	L	L	L	L	L					
13														L	L	L								
14													L	L	L	L								
15											L	L	B	L	L	L	L							
16											L	L	L	L	L	L	L	L						
17												L	L	L	L	L	L	L						
18												L	L	L		L	L	L						
19											L	L	L	L	L	L	L	L						
20												L	L	L	L	L	L	L						
21													L	L		L								
22														L	L	L								
23														L	L	L								
24															L									
25												L	L	L	L	L	L	L						
26													L	L	L	L	L							
27													L	L	A	L	L	L						
28												L	L	L	L	L	L							
29													L	L	L	L	L							
30													L	L	L	L	L	L						
31												L	L	L	L	L	L							
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																								
MED																								
UQ																								
LQ																								

DEC. 1982

FOF1 (0.01 MHz)

# IONOSPHERIC DATA

DEC. 1982      FOE (0.01 MHz)

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

Station **OKINAWA**    Lat. **26 16.9 N**    Long **127 48.4 E**    Sweep **1** MHz to **25** MHz in **25** 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	245	300	330	350	365	365	A	A	H	H						
2								S	H	H							A	A	A					
3								S	H	A							A	A	H					
4								S	235	300	330	355	H	365	360	340	325	H	280	205				
5								S	240	300	340	350		A	A	A	A	A	A					
6								S	240	310	340	370		A	A	A	A	A	A					
7								S	245	305	340	360	375		A	A	A	A	A					
8								S	H	B		H	U	R	A	A	A	A	A					
9								S	H	H	H	A	H	390	A	A	A	A	A					
10								S	A	H	370	400	415	400		B	380	335	A					
11								S	235	H	H	H	390	380		B	A	A	S					
12									235	315	345	360		A	A	A	A	A	A					
13									260	310	345	350		A	375	365		A	A	A				
14									240	305		A	A	375	A	A	A	A	A					
15									H	H		B		A	A	A		285	H	205				
16									H	320	H	375	385	370	H	A	330	H	A					
17									215	295	330	355	370	365	H	A	A	A	A					
18									250	H	H		A	A	A	365	350	A	A	A				
19									240	A	A	A	A	A	A	A	A	A	A					
20									A	300		A	A	A	A	A	A	A	A					
21									220	A	335	345		A	A	A	A	A	A					
22									240	300	330	345	355	355		A	A	A	A					
23									215	290	315	335		A	A	350	A	A	220					
24									235	280	305	320	330		A	A	A	300	A					
25									H	200	290	320		A	A	A	A	295	B					
26									200	R	270	315	350		A	A	A	A	A					
27									225	A	335	345	355		A	A	A	H	220					
28									H	H	H	H		A	A	A	A	300	A					
29									A	A	H	H		355	335	330	H	A	A	A				
30									225	275	315		B	A	A	A	A	A	A					
31									220	280	325	340		A	A	A	A	H	A					
CNT									28	25	28	23	17	12	7	3	10	6						
MED									235	300	335	355	370	365	345	330	292	208						
UQ									242	310	342	360	385	372	350	355	300	220						
LQ									222	290	328	348	365	358	340	328	280	H	H	205				

DEC. 1982      FOE (0.01 MHz)



# IONOSPHERIC DATA

DEC. 1982

FOES (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		OKINAWA							Lat. 26 16.9 N		Long. 127 48.4 E		Sweep 1 MHz to 25 MHz in 25sec in automatic operation											
Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E 16	E 16	E 16	J A 26	E 16	E 16	E 16	E 16	G	G	36	41	41	G	36	J A 36	G 20	G	J A 24	J A 21	J A 25	E 16	E 16	E 16
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	34	36	G	G	G	J A 39	J A 32	J A 33	J A 21	J A 26	J S 16	J A 24	J A 18	J A 26	
3	E 16	E 16	J S 16	E 16	E 15	E 16	E 16	E 16	G	J A 30	39	44	J A 50	J A 66	G	J A 47	J A 32	G	J S 14	J S 14	J A 18	E 16	J A 36	J A 19
4	E 16	E 16	E 16	E 16	E 16	E 15	E 16	E 16	G	G	G	G	38	42	G	48	32	27	J A 21	J A 22	J A 30	J A 21	J A 20	E 16
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	40	44	43	44	J A 47	J A 40	J A 32	J A 41	E 16	E 16	E 16	E 16	E 16	E 16
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	41	47	47	45	J A 47	J A 40	J A 40	J A 39	J A 36	J A 22	J A 20	J A 24	J A 18	E 16
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	42	41	53	46	70	J A 41	E 16	J A 24	E 16	E 16	J A 21
8	E 16	E 16	13	J A 21	J A 28	J S 13	E 16	E 16	G	E B 58	G	G	46	J A 56	48	40	37	26	E 16	E 16	J A 21	J A 33	J A 21	J A 21
9	J A 34	E 16	J A 21	E 16	E 16	E 16	J A 17	E 16	G	G	G	J A 51	J A 55	56	J A 51	J A 40	30	J A 31	J A 41	J A 20	J S 12	E 16	E 16	E 16
10	E 16	E 16	E 16	E 16	E 16	E 16	J A 36	J A 33	J A 34	G	G	43	45	49	J A 80	G	G	J A 22	E 16	E 16	J S 15	J A 17	J A 15	E 16
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	49	53	E B 47	J A 81	J A 76	J A 85	J A 24	J A 21	J A 24	J A 26	E 16	E 16
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	44	J A 78	J A 43	J A 62	J A 74	J A 54	J A 58	J A 41	J A 33	J A 26	E 16	E 16	J A 20
13	J A 21	J A 20	J A 32	J A 28	J A 24	E 16	E 16	E 16	G	G	G	G	J A 37	J G 33	40	36	34	22	E 16	J A 32	J A 30	J A 20	J A 27	J A 30
14	J A 29	J A 25	E 16	J A 20	J A 20	E 16	E 16	E 16	G	G	40	40	41	43	J A 47	J A 85	J A 64	J A 57	J A 32	J A 38	J A 20	J A 20	J A 21	J A 20
15	E 16	E 16	E 16	E 16	E 16	E 16	E 14	E 16	G	G	G	B	G	J A 37	J A 40	J A 35	G	G	J A 21	E 16	E 14	J A 26	J A 24	J A 15
16	E 16	J A 26	E 16	E 16	E 16	J A 18	E 16	E 16	G	G	G	G	G	G	J A 38	J G 30	G	J A 30	J A 26	J A 24	J S 16	J A 20	E 16	E 16
17	E 16	J S 14	J S 13	E 16	J A 24	E 16	E 16	E 16	G	G	G	G	42	42	J A 44	J A 44	J A 39	J A 27	J A 19	J A 24	J A 17	J S 15	J S 16	J A 26
18	J A 25	J A 64	J A 28	J A 21	J A 18	J A 17	J A 24	E 16	G	G	G	45	44	47	J A 73	38	31	23	J A 22	E 16	E 16	E 16	E 16	J A 18
19	E 16	J A 28	J A 25	J A 25	J A 21	J A 18	J A 24	17	G	J A 41	56	121	78	87	109	82	55	29	25	54	J A 21	J A 29	J A 21	J A 21
20	J A 20	E 16	E 16	E 16	E 16	E 16	E 16	J A 24	J A 33	G	38	40	J A 42	J A 39	J A 37	J A 53	J A 40	J A 38	J A 38	J A 35	J A 41	J A 31	J A 22	J A 16
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	J A 35	J A 30	39	41	40	44	37	J A 57	J A 54	J A 36	J A 48	J A 31	J A 24	E 16	E 16	E 16
22	E 16	E 16	J A 24	J A 26	J A 28	J A 18	E 16	E 16	G	G	G	G	G	G	J A 46	J A 40	J A 89	J A 88	J A 24	J A 25	J A 25	J A 26	J A 16	E 16
23	E 16	E 16	E 16	E 16	J A 21	J A 17	J A 21	J A 21	G	G	G	G	42	40	G	J A 37	J A 31	G	E 16	E 16	J A 24	J A 22	J A 26	J A 24
24	E 16	J A 18	E 16	E 16	J A 29	E 16	E 16	E 16	G	G	G	G	41	J A 39	J A 37	J A 35	24	41	24	29	22	20	E 16	E 16
25	E 14	E 16	E 16	E 16	E 14	E 14	J A 26	J A 26	J A 21	G	G	J A 46	J A 47	J A 56	J A 42	J A 35	G	E B 23	E 16	J A 24	J A 26	J A 18	E 16	E 16
26	E 16	E 16	J A 19	E 16	E 16	J A 24	J A 20	J A 18	J A 31	36	44	44	J A 54	J A 41	J A 37	J A 63	J A 41	J A 24	E 16	J S 16	E 16	E 16	E 16	E 16
27	E 16	E 16	E 16	E 16	E 15	E 16	E 16	J A 16	G	J A 32	G	G	43	J A 86	J A 60	J A 41	G	G	J A 36	J A 31	J A 30	J A 30	J A 22	J A 17
28	J A 26	J A 28	J A 24	J A 26	J S 15	E 16	E 16	E 16	G	G	G	G	J A 60	J A 58	J A 60	J A 61	J G 28	J A 33	J A 33	J A 32	J A 21	J A 21	E 16	E 16
29	E 16	E 16	E 16	E 16	J A 26	J A 21	J A 20	J A 24	J A 27	J A 35	G	G	G	G	G	39	J A 52	J A 24	J A 20	24	J A 27	J A 22	J A 24	E 16
30	E 16	E 16	E 16	E 16	J A 22	E 16	E 16	E 16	G	G	E B 45	J A 41	J A 40	J A 39	J A 38	J A 38	J A 28	J A 30	J A 17	E 16	E 16	E 16	E 16	E 16
31	E 16	J A 17	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	J A 39	J A 38	J A 37	J A 38	G	J A 30	J A 30	J A 25	J A 32	J A 27	J A 21	E 16
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	30	31	31	31	31	31
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	E G 40	42	42	J A 40	J A 40	J A 32	J A 29	J A 24	J A 24	J A 21	J A 17	J A 17	E 16
UQ	E 16	16	16	18	J A 21	E 16	16	16	G	E G 30	37	44	47	51	J A 48	J A 53	J A 44	J A 38	J A 33	J A 30	J A 26	J A 25	J A 21	J A 20
LQ	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	38	38	37	J A 38	G	23	J A 19	S 16	J S 16	E 16	E 16	E 16

DEC. 1982

FOES (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

FBES (0.1 MHz)

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

Station		OKINAWA							Lat. 26 16' 9" N		Long. 127 48' 4" E		Sweep 1 MHz to 25 MHz in 25sec 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	E 16	E 16	S 16	G	G	36	38	40	G	35	33	G 19	G	E	E	E	E 16	E 16	E 16	
2		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	33	36	G	G	G	32	30	24	E	20	S	E	18	20		
3		E 16	S 16	E 16	S 16	E 15	E 16	E 16	S 16	G	30	38	40	46	47	G	42	29	G	S	S	E	E 16	24	19	
4		E 16	S 16	E 16	S 16	E 16	E 15	E 16	S 16	G	G	G	G	38	39	G	43	32	26	21	18	26	19	18	E 16	
5		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	38	43	41	38	38	33	29	21	E 16	E 16	E 16	E 16	E 16	E 16	
6		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	37	46	47	43	42	38	34	36	28	19	19	19	E	E 16	
7		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	G	G	40	40	36	35	34	40	E 16	E	E 16	E 16	E	
8		E 16	S 16	E	S	E	E	S	E 16	G	E B 58	G	G	45	46	46	35	31	25	E 16	E 16	E	21	E	E	
9		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	41	45	49	49	35	30	26	22	E	S	E 16	E 16	E 16	
10		E 16	S 16	E 16	S 16	E 16	E 16	A A 36	29	G	G	43	45	47	49	G	G	21	C	E 16	E 16	S	E	E 16		
11		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	G	48	51	E B 47	48	69	77	19	21	E	E	E 16	E 16	
12		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	40	44	40	47	61	34	36	32	19	18	E 16	E 16	E	
13		E	17	25	24	E	E 16	E 16	S 16	G	G	G	G	37	32	G	40	35	33	21	E 16	32	27	E	27	25
14		27	22	E 16	E	E	E 16	E 16	S 16	G	G	38	39	40	42	45	47	37	33	30	30	E	E	E	E	
15		E 16	S 16	E 16	S 16	E 16	E 16	E 14	E 16	G	G	G	B	G	37	36	35	G	G	E	E 16	E 14	E	E	S	
16		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	G	G	36	30	G	G	26	19	18	S	E	E 16	E 16	
17		E 16	S 16	S 16	E 16	E 16	E 16	E 16	S 16	G	G	G	G	41	39	40	40	28	24	E	18	E	S	S	23	
18		21	25	25	20	E	E	E	E 16	G	G	G	41	42	41	63	37	31	23	E	E 16	E 16	E 16	E	E 16	
19		E 16	E	20	20	E	E	E	E	G	31	47	57	50	62	58	51	46	25	E	25	E	18	19	17	
20		E	E 16	E 16	E 16	E 16	E 16	E 16	18	25	G	35	38	38	37	36	40	31	24	36	30	40	30	19	S	
21		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	18	30	38	40	39	41	37	40	37	25	40	30	20	E 16	E 16	E 16	
22		E 16	S 16	E	20	E	E	E 16	E 16	G	G	G	G	G	39	37	55	34	18	25	17	22	E 16	E 16	E 16	
23		E 16	S 16	E 16	S 16	E	E	E	E	19	G	G	G	39	37	G	36	30	G	E 16	E 16	21	19	25	19	
24		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	G	38	36	35	33	G	24	26	E	22	19	18	E 16	E 16
25		E 14	E 16	E 16	E 16	E 14	E 14	E	E	G	G	G	40	46	36	35	33	G	E B 23	E 16	E	E	18	E 16	E 16	
26		E 16	S 16	E 16	S 16	E 16	E 16	E	E	17	32	41	43	47	36	36	39	22	21	E 16	S	E 16	E 16	E 16	E 16	
27		E 16	S 16	E 16	S 16	E 14	E 15	E 16	E 16	E	G	29	G 20	G	40	58	48	34	G	G	30	26	28	27	20	E
28		20	25	20	E	S	E 15	E 16	E 16	G	G	G	G	38	37	36	33	22	24	21	17	E	E 16	E 16	E 16	
29		E 16	S 16	E 16	S 16	E	E	E	E	24	28	G	G	G	G	G	30	23	18	18	19	E	18	E 16	E 16	
30		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	E B 45	38	37	36	35	31	27	E	E	E 16	E 16	E 16	E 16	
31		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	G	39	38	35	33	G	23	18	21	18	25	E	E 16	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		31	30	28	31	30	30	31	31	31	31	31	30	31	31	31	31	31	31	29	29	28	29	30	29	
MED		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	G	G	E G 38	40	38	36	35	30	24	18	18	16	16	16	E 16	
UQ		E 16	S 16	E 16	S 16	E 16	E 16	E 16	S 16	G	E G 28	36	40	45	42	45	40	34	26	22	22	19	19	18	E 16	
LQ		E 16	S 16	E 16	S 16	E 16	E 14	E 15	E 16	G	G	G	G	38	36	35	33	G	22	21	E	16	E	E	E 16	E 16

DEC. 1982

FBES (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

F-MIN (0.1 MHz)

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

Station	OKINAWA																							Lat.	26 16' 9" N		Long.	127 48' 4" E		Sweep	1 MHz to 25 MHz		in 25 sec		in automatic operation									
Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																				
1	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	17	19	20	25	19	17	17	E S	E S	E S	E S	E S	E S																			
2	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	18	22	24	24	19	18	19	17	E S	E S	E S	E S																			
3	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	19	23	19	18	18	19	16	E S	E S	E S	E S																			
4	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	19	22	22	23	16	16	16	E S	E S	E S	E S																			
5	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	19	22	20	23	19	16	E S	E S	E S	E S																			
6	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	17	19	20	26	25	25	22	20	16	E S	E S	E S	E S																			
7	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	19	24	24	28	25	24	20	16	E S	E S	E S	E S																				
8	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	58	32	30	32	27	25	24	21	16	E S	E S	E S																				
9	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	18	19	23	30	26	26	22	18	16	E S	E S	E S																				
10	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	18	27	29	39	31	42	30	24	E S	C	E S	E S																				
11	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	17	21	22	26	26	47	25	18	E S	E S	E S	E S																				
12	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	19	21	23	24	22	22	17	18	E S	E S	E S	E S																				
13	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	24	16	15	14	E S	E S	E S	E S																				
14	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	17	20	22	22	27	20	18	16	15	E S	E S	E S																				
15	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	18	B						E S	E S	E S	E S																				
16	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	17	18	22	23	17	16	16	16	E S	E S	E S																				
17	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	17	30	18	18	27	18	20	E S	E S	E S																				
18	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	17	21	24	22	25	16	16	E S	E S	E S																				
19	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	18	22	23	23	23	19	17	17	E S	E S	E S	E S																				
20	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	18	23	25	20	19	19	18	E S	E S	E S	E S																				
21	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	22	22	23	20	25	25	18	E S	E S	E S	E S																				
22	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	18	19	20	20	18	17	20	E S	E S	E S	E S																				
23	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	17	18	20	20	19	20	19	15	E S	E S	E S	E S																				
24	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	15	16	16	16	19	15	20	15	E S	E S	E S																				
25	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	19	18	17	16	16	16	23	E S	E S	E S																				
26	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	15	16	17	25	18	16	17	16	16	E S	E S	E S																				
27	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	17	16	17	18	18	16	E S	E S	E S																				
28	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	17	16	17	18	17	15	E S	E S	E S																				
29	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	15	16	17	18	19	18	18	24	17	E S	E S	E S																				
30	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	17	45	20	21	22	18	18	16	E S	E S	E S																				
31	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	18	19	18	19	16	15	16	E S	E S	E S																				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																				
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31																				
MED	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	18	22	22	20	19	18	17	E S	E S	E S	E S																				
UQ	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	18	20	24	24	24	22	20	18	E S	E S	E S																				
LQ	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	16	16	18	18	18	18	16	16	16	E S	E S	E S																				

DEC. 1982

F-MIN (0.1 MHz)

# IONOSPHERIC DATA

DEC. 1982

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26 16.9 N Long 127 48.4 E Sweep 1 MHz to 25 MHz in 25sec 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	270	245	335	355	330	265	260	230	310	330	U R 325	295	295	295	300	290	U R 295	R 310	U S 310	U S 295	295	U S 260	U S 280	U S 260	
2	260	260	285	300	315	340	255	300	310	335	340	305	310	285	265	295	310	325	325	320	315	U S 290	U S 295	U S 275	
3	260	265	320	370	365	H 260	275	290	330	340	330	325	305	285	305	300	R 300	315	305	290	290	300	320	320	
4	H 230	240	275	300	330	H 250	280	S 300	320	315	325	300	280	280	270	280	290	300	300	315	290	300	S 310	S 530	
5	S 245	260	265	275	305	280	280	320	330	320	295	295	280	280	280	275	285	285	300	290	S 280	U S 265	S 280	U S 255	
6	U S 260	275	S 270	S 280	S 325	335	H 270	290	340	330	335	295	290	300	290	295	R 290	295	S 300	S 280	S 295	S 305	S 295	295	
7	275	285	S 295	U S 275	U S 295	290	305	310	325	325	340	305	285	290	275	280	280	R 290	295	285	310	300	270	U S 250	
8	280	270	250	260	250	S 255	S 320	S 295	320	295	290	300	S 325	R 280	280	285	285	295	310	290	S 285	S 285	H 260	S 280	
9	265	275	325	250	250	225	265	245	295	280	295	U R 285	R 245	R 270	R 260	R 260	U R 270	U R 270	S 285	285	300	S 300	S 295	S 300	
10	250	S 220	S 325	S 335	310	270	A	295	340	345	325	305	290	265	280	280	R 280	285	C 280	U S 280	S 270	S 280	S 285	260	
11	260	255	255	S 245	S 275	H 240	S 275	S 315	320	315	290	285	285	280	275	270	275	295	310	295	285	280	295	295	
12	290	315	S 300	S 250	280	H 230	S 255	S 300	305	295	305	290	275	270	260	265	R 255	265	270	280	280	295	295	280	
13	280	320	S 325	S 300	260	285	280	295	315	320	325	315	300	290	285	290	295	315	305	300	U S 305	295	305	325	
14	275	305	325	295	315	265	285	305	S 310	305	320	290	R 285	280	R 255	280	280	280	290	285	290	300	S 300	S 275	
15	285	S 285	300	310	350	270	285	285	315	320	300	B	285	275	280	285	285	285	295	300	295	290	285	320	
16	275	280	285	315	345	260	270	295	315	320	315	305	260	270	260	270	275	280	295	295	315	300	255	S 250	
17	245	270	270	270	290	250	250	275	310	285	295	270	275	270	270	275	275	280	290	295	275	290	315	265	
18	240	290	325	290	270	255	235	250	300	330	295	305	300	300	275	270	290	305	300	S 270	U S 280	U S 310	330	H 290	
19	265	230	275	335	280	240	245	260	305	305	285	U R 300	280	285	275	290	285	305	305	290	S 295	305	S 240	S 250	
20	280	260	265	S 340	260	255	240	285	330	325	325	285	300	285	285	R 285	R 290	R 300	300	290	S 300	S 295	S 265	F	
21	F	F	U S 265	U S 250	F	F	F	F	U S 320	320	320	310	295	305	295	305	300	320	310	U S 265	U S 275	S 305	S 295	U S 250	
22	240	240	265	295	295	280	265	305	H 320	335	325	310	320	275	295	280	285	295	325	U S 285	S 265	275	320	U S 285	
23	275	260	235	U S 245	H 350	U S 225	U S 215	290	310	325	340	335	300	300	295	R 300	290	300	U S 305	315	310	290	U S 305	J S 230	
24	J S 210	J S 235	S 250	S 255	230	H 210	265	S 270	320	320	335	315	305	295	R 300	310	295	305	335	U S 275	305	320	335	H 240	
25	265	310	H 280	285	270	270	270	280	315	335	S 325	R 330	320	305	310	285	295	305	S 310	S 310	295	J S 310	310	320	
26	S 240	U S 240	S 265	H 270	285	260	F	F 285	315	335	345	S 355	305	300	300	305	300	300	285	290	295	S 310	295	U S 270	
27	S 260	290	305	310	290	295	270	280	325	325	250	305	305	300	290	290	295	S 290	S 300	295	260	310	315	F	
28	F	F	S 315	S 300	315	250	275	305	335	340	335	345	300	300	295	295	315	310	315	290	290	325	330	305	
29	285	270	J S 300	295	325	265	260	275	U S 340	355	295	S 300	R 300	280	275	R 280	U R 280	300	U S 295	310	305	310	S 290	S 330	
30	255	265	270	330	300	280	300	275	340	355	325	310	305	295	290	295	300	315	U S 290	305	S 315	325	295	270	
31	295	295	275	305	260	310	305	300	310	340	325	280	310	290	R 290	295	285	300	320	S 300	295	S 330	U S 310	320	290
CNT	29	29	31	31	30	30	28	30	31	31	31	30	31	31	31	31	31	31	30	31	31	31	31	29	
MED	265	270	280	295	295	262	270	290	320	325	325	305	300	285	280	285	290	300	300	290	295	300	295	280	
UQ	275	285	310	310	325	280	280	300	328	335	328	310	305	298	295	295	295	308	310	298	305	310	312	300	
LQ	250	255	265	270	270	250	258	275	310	318	295	295	285	280	275	280	280	288	295	285	282	290	285	S 260	

DEC. 1982

M(3000)F2 (0.01)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1982

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA																								Lat.	26 16.9 N		Long.	127 48.4 E		Sweep	1	MHz to	25	MHz in	25sec	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																													
2												L	L	L	L																														
3												L	L	L	L																														
4												L	L	L	L	L																													
5												L	L	L	L	L																													
6												L	L	L	L	L																													
7													L	L	L	L																													
8											L		L	L	L	L																													
9												L	L	L	L	L	L																												
10													L	L	L	L																													
11												L	L	L	L	L																													
12													L	L	L	L	L	L																											
13													L	L	L																														
14												L	L	L	L																														
15										L	L	B	L	L	L	L																													
16										L	L	L	L	L	L	L	L																												
17											L	L	L	L	L	L	L																												
18											L	L	L		L	L	L																												
19										L	L	L	L	L	L	L	L																												
20											L	L	L	L	L	L	L																												
21													L	L		L																													
22														L	L	L																													
23													L	L	L																														
24															L																														
25											L	L	L	L	L	L	L																												
26												L	L	L	L	L																													
27												L	L	A	L	L	L																												
28											L	L	L	L	L	L																													
29												L	L	L	L	L																													
30											L	L	L	L	L	L	L																												
31										L	L	L	L	L	L	L																													
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																					
CNT																																													
MED																																													
UQ																																													
LQ																																													

DEC. 1982

M(3000)F1 (0.01)

### IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F2 (KM)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA																								
Lat.	26 16.9 N												Long	127 48.4 E											
Sweep	1 MHz to 25 MHz in 25sec 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	250	260	240	280	270	260									
2												270 <sup>h</sup>	275	270	265										
3												255	265	300	295										
4												285	255	300	290	290									
5												280	250	290	285	290									
6												305	280	265	280	270									
7													290	290	290	280									
8										290			270	325	315	290									
9												275	310	310	320	310	280								
10													300	300	300	290									
11												290	310	290	335	300									
12													290	305	300	325	310	290							
13													270	290	285										
14												290	285	290	280										
15										260	250		B	315	315	315	285								
16										270	250	255	350	340	315	295	280								
17										265 <sup>h</sup>	310 <sup>h</sup>	300	315	315	305	300									
18										290	270	265		280	300	275									
19									250	255	280	250	310	315	275	270									
20										250	230	285	250	280	280	265									
21													265	270		280									
22														290	275	300									
23														280	280	285									
24															280										
25											240	235	250	275	250	280	260								
26													225	275	250	275	250								
27													250	270	275	285	290	275							
28											240	240	230	280	280	270									
29													280	290	255	295	290								
30													235	245	245	240	265	270	265						
31											240	240	275	265	260	270	240								
00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT									5	12	21	29	29	30	25	10	1								
MED									250	250	270	275	290	285	290	275	290								
UQ									260	260	280	290	300	300	295	280									
LQ									250	240	250	265	270	280	275	265									

DEC. 1982

H<sup>o</sup>F2 (KM)

# IONOSPHERIC DATA

DEC. 1982

H<sup>o</sup>F (KM)

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

Station Hour Day	OKINAWA										Lat. 26	16.9	N	Long 127	48.4	E	Sweep 1	MHz to 25 MHz in 25sec 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	240	250	230	200	230	E S 325	305	275	240	235	235	230	220	H	H	215	220	230	200	195	215	230	225	220					
2	255	265	240	230	240	230	305	265	240	240	H	H	210	210	H	H	220	200	225	210	205	215	235	235	225				
3	290	295	240	210	215	H	305	270	240	240	H	240	230	A	E A	205	E A	220	H	205	200	190	215	215	240	240			
4	230	360	290	250	215	H	280	265	240	240	H	220	235	230	H	H	255	245	230	200	200	A	235	230	225				
5	225	320	300	265	250	245	250	250	235	235	H	220	240	220	225	235	245	250	245	225	195	205	H	210	225				
6	240	235	240	265	245	225	250	280	245	H	230	H	235	H	230	A	230	240	245	230	215	200	220	220	215	220			
7	270	275	260	275	250	230	245	240	235	H	235	H	230	H	225	220	220	230	240	245	245	220	200	230	210	245	320		
8	335	310	300	275	295	300	230	235	235	265	250	H	250	245	245	H	H	250	245	250	215	240	225	265	240	220			
9	285	300	235	E S 365	390	375	315	320	255	245	230	215	H	H	240	250	H	235	245	230	215	200	215	215	225	225			
10	240	350	240	195	E S 275	S 330	A	275	235	230	H	230	225	H	235	245	250	250	255	240	C	230	265	230	225	230			
11	260	330	335	355	275	240	275	235	245	240	235	225	250	250	250	A	315	A	290	225	215	245	250	230	235				
12	225	245	250	335	265	265	350	275	235	245	H	240	H	235	240	230	240	A	250	255	250	230	230	230	220	215			
13	250	240	235	250	250	245	230	295	250	230	H	225	H	225	240	H	225	H	205	H	225	225	225	230	245	250	235		
14	A	275	225	280	270	350	275	255	250	245	H	235	H	225	225	230	240	A	245	235	230	230	235	225	220	215			
15	230	250	245	215	200	305	260	280	250	240	240	B	215	H	H	H	240	H	230	H	215	205	240	210	240	215	215		
16	250	290	265	250	215	H	245	280	260	250	230	240	220	H	195	H	H	225	235	225	H	200	210	210	200	240	295		
17	300	290	260	275	240	330	360	310	250	240	H	240	235	H	245	240	245	H	E A	250	245	260	210	220	250	210	E A	260	
18	350	290	240	210	265	280	340	380	240	220	H	220	230	230	235	250	235	H	240	245	210	230	260	225	215	200			
19	285	305	310	230	250	255	335	320	255	240	240	260	A	260	260	255	235	240	215	210	225	250	300	290					
20	235	215	205	220	250	310	315	280	250	230	235	220	H	210	220	H	215	235	235	235	225	230	245	250	260	275			
21	240	215	215	285	280	230	260	275	230	245	H	240	H	225	225	H	230	H	250	240	245	210	205	230	230	215	220		
22	285	345	290	255	260	255	300	275	250	245	H	225	H	225	215	220	245	230	A	250	245	240	200	230	290	250	205		
23	230	325	355	275	190	215	335	290	230	235	H	235	H	230	H	225	H	215	H	220	H	240	240	215	200	205	200	210	255
24	315	245	260	290	350	350	300	275	250	240	H	230	H	230	H	220	H	215	210	H	230	230	240	200	225	230	220	215	240
25	265	255	245	270	250	305	305	305	250	230	H	225	220	A	240	H	215	H	235	H	225	240	245	205	195	240	210	205	220
26	225	285	230	230	240	285	250	250	240	H	H	240	225	A	A	235	210	210	A	240	230	220	210	220	215	215	205	220	
27	235	245	225	230	265	250	300	305	245	225	H	215	H	195	230	A	A	H	215	230	240	215	210	A	260	235	215	220	
28	240	240	230	240	225	225	290	275	235	230	235	230	215	H	205	H	200	H	235	240	220	220	220	220	255	230	220	235	
29	305	320	270	255	240	310	325	315	250	215	H	215	H	215	H	205	220	220	H	215	245	245	200	215	215	215	220	215	
30	285	310	305	240	200	325	280	310	240	225	215	E B	240	230	210	H	215	235	240	230	205	210	210	210	210	210	285		
31	260	240	265	255	295	275	260	275	245	230	H	220	H	210	225	H	205	H	230	H	215	200	240	225	225	215	250		
CNT	30	31	31	31	31	31	30	31	31	31	31	30	30	30	30	29	31	31	31	30	31	31	31	31	31	31	31		
MED	252	285	245	252	250	270	295	275	245	235	H	235	H	225	225	224	228	235	240	240	215	210	225	230	220	225			
UQ	285	310	280	275	266	314	315	300	250	240	240	230	235	240	240	245	245	245	245	225	228	232	238	238	242				
LQ	235	245	235	230	235	242	260	265	238	230	H	H	H	H	H	H	H	H	230	230	228	205	200	215	215	215	220		

DEC. 1982

H<sup>o</sup>F (KM)

# IONOSPHERIC DATA

DEC. 1982      H°E (KM)

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

Station	OKINAWA							Lat. 26 16.9 N	Long 127 48.4 E	Sweep 1 MHz to 25 MHz in 25sec 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	H 115	H 115	H 115	H 115	H 115	H 115	A	115	110								
2								S	115	110	115	110	110	110	H 110	A	A	A							
3								S	110	A	110	110	H 105	105	105	110	110	E 120	S						
4								S	110	110	110	105	105	110	H 105	H 105	A 110	E 125	A						
5								S	115	110	110	110	110	110		A	A	A							
6								S	120	115	115	115	115	110	115	110	110	A							
7								S	115	115	115	110	110	110	110	115	115	A							
8								S	120	B	120	115	120	115	115	115	120	A							
9								S	115	115	115	115	115	115		A	A	110	A						
10								S	A	115	H 115	H 120	125	115	B	H 115	H 120	A							
11								S	120	120	115	115	120	115	B	120	120	S							
12									125	115	115	110	110	110	110	110	A	A							
13									H 100	110	105	105	H 105	A	A 115	A 115	A 115	E 125	A	S					
14									115	115	110	110	110	110	110		A	A	A						
15									H 115	110	110	B	105	105	105		A	110	E 125	S					
16									H 115	110	H 110	H 110	105	105	H 105	A	E 120	A 105	H	A					
17									115	110	110	H 115	B 105	105	110	110	115	S							
18									120	H 105	H 110	H 110	110	110	110	120	120	A	A						
19									S 125	A 120	115	115	115	115	115	115	115	A							
20									A	H 100	110	110		A	A	A	A	A	A						
21									A 130	A	105	H 110	110	110	110		A	A	A						
22									S 130	115	115	110	110	110	110		A	A	A						
23									E A 130	A 110	H 110	H 110	110	110	110	H 110	A	A	120						
24									H 120	110	110	110	110	H 105	110	110	A	E 125	A	A					
25									E A 115	110	105	H 105	105	105		A	A	A	H 105	B					
26									A 115	105	H 105	115	105	105		A	A	A	A						
27									E B 125	A	A 110	A 105	H 110	110	110	110	H 110	H 105	H 105						
28									H 105	110	110	110		A	A	A	A	125	135						
29									A	A	115	110	110	110	110	110		A	A						
30												B 110	110	110		A	115	A	A						
31													A 120	115	110	110	A	110	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									28	26	31	29	27	27	21	16	19	7							
MED									115	110	110	110	110	110	110	114	112	112							
UQ									120	115	115	115	112	112	115	115	118	125							
LQ									115	110	110	110	105	110	110	110	110	112							

DEC. 1982      H°E (KM)



# IONOSPHERIC DATA

DEC. 1982

H<sup>°</sup>ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		OKINAWA		Lat.		26 16.9 N		Long		127 48.4 E		Sweep		1 MHz to 25 MHz		in 25 sec		in automatic operation							
Hour	Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S	S	S	100	S	S	S	S	G	G	160	130	130	G	120	115	110	G	115	125	110	S	S	S	
2	S	S	S	S	S	S	S	S	G	E G	E G	G	G	G	G	105	105	105	100	115	S	100	100	105	
3	S	S	S	S	S	S	S	S	G	110	150	140	130	125	G	120	105	G	S	S	130	S	100	95	
4	S	S	S	S	S	S	S	S	G	G	G	G	150	135	G	155	190	155	125	105	105	105	100	S	
5	S	S	S	S	S	S	S	S	G	G	120	115	110	110	110	100	105	105	S	S	S	S	S	S	
6	S	S	S	S	S	S	S	S	G	G	120	115	115	115	110	110	110	100	100	100	100	100	100	S	
7	S	S	S	S	S	S	S	S	G	G	G	G	G	115	110	110	110	105	100	S	105	S	S	100	
8	S	S	S	100	95	S	S	S	G	B	G	G	E G	180	115	120	120	125	115	S	S	100	100	100	100
9	105	S	100	S	S	S	110	S	G	G	G	G	120	120	105	105	110	105	100	95	95	S	S	S	S
10	S	S	S	S	S	S	100	100	110	G	G	130	130	115	115	G	G	115	C	S	S	S	S	95	S
11	S	S	S	S	S	S	S	S	G	G	G	G	120	110	B	115	110	105	110	100	100	100	S	S	S
12	S	S	S	S	S	S	S	S	G	G	G	G	125	110	110	110	105	100	100	100	100	100	S	S	100
13	100	100	100	100	100	S	S	S	G	G	G	G	100	100	125	120	115	110	S	100	100	100	100	100	100
14	100	100	S	100	100	S	S	S	G	G	115	115	115	110	105	100	100	100	100	100	100	100	100	100	100
15	S	S	S	S	S	S	S	S	G	G	G	B	G	105	105	105	G	G	100	S	S	100	95	S	
16	S	100	S	S	S	100	S	S	G	G	G	G	G	G	100	105	G	100	100	95	S	100	S	S	
17	S	S	S	S	105	S	S	S	G	G	G	G	135	130	120	115	110	110	110	105	105	S	S	105	S
18	105	105	100	100	100	100	100	S	G	G	G	125	120	115	110	115	110	H	110	110	S	S	S	105	S
19	S	110	100	100	95	105	100	100	G	115	120	115	115	110	110	105	110	100	100	95	95	95	90	90	S
20	95	S	S	S	S	S	S	100	100	G	115	105	105	110	105	105	105	100	95	95	90	90	90	S	S
21	S	S	S	S	S	S	S	S	100	105	140	130	120	120	120	105	100	100	100	95	95	S	S	S	S
22	S	S	105	100	100	100	S	S	G	G	G	G	G	G	105	110	105	100	100	100	100	100	105	S	S
23	S	S	S	S	105	100	100	100	100	G	G	G	115	120	G	100	100	G	S	S	110	105	100	100	S
24	S	100	S	S	100	S	S	S	G	G	G	G	130	115	110	100	100	100	100	100	100	100	100	S	S
25	S	S	S	S	S	S	110	95	100	G	G	130	115	105	105	105	G	B	S	100	100	100	S	S	S
26	S	S	95	S	S	100	100	105	100	160	140	130	110	105	110	105	110	105	S	S	S	S	S	S	S
27	S	S	S	S	S	S	S	100	G	100	100	G	155	115	115	125	G	G	100	95	150	115	100	100	S
28	105	100	100	100	S	S	S	S	G	G	G	G	110	105	105	100	100	125	95	95	100	100	S	S	S
29	S	S	S	S	95	100	100	95	95	100	G	G	G	G	G	115	110	100	95	95	95	100	95	S	S
30	S	S	S	S	100	S	S	S	G	G	G	B	115	115	115	115	110	105	100	100	S	S	S	S	S
31	S	100	S	S	S	S	S	S	G	G	G	G	110	110	110	110	G	105	100	95	90	115	95	S	S
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	6	8	7	8	11	7	8	8	7	7	11	14	25	26	25	30	25	25	23	22	22	19	16	11	
MED	102	100	100	100	100	100	100	100	100	108	120	125	115	112	110	110	110	105	100	100	100	100	100	100	100
UQ	105	102	100	100	100	100	105	100	100	125	142	130	130	115	115	115	110	110	100	100	105	102	100	100	
LQ	100	100	100	100	98	100	100	98	100	102	118	115	110	110	105	105	105	100	100	95	100	100	95	100	

DEC. 1982

H<sup>°</sup>ES (KM)

# IONOSPHERIC DATA

DEC. 1982

TYPES OF ES

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

Station **OKINAWA** Lat. **26 16.9 N** Long **127 48.4 E** Sweep **1** MHz to **25** MHz in **25** sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1			F <sub>1</sub>								H <sub>1</sub>	H <sub>1</sub>	C <sub>1</sub>		C <sub>1</sub>	L <sub>2</sub>	L <sub>1</sub>		F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>					
2										H <sub>2</sub>	H <sub>1</sub>					L <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	F <sub>1</sub>	FF <sub>13</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>2</sub>		
3			F <sub>1</sub>							L <sub>2</sub>	H <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>		C <sub>3</sub>	C <sub>2</sub>		F <sub>1</sub>	F <sub>1</sub>	FF <sub>11</sub>		F <sub>3</sub>	F <sub>3</sub>		
4													H <sub>1</sub>	H <sub>1</sub>		H <sub>2</sub>	HL <sub>12</sub>	HL <sub>21</sub>	FF <sub>51</sub>	F <sub>3</sub>	F <sub>7</sub>	F <sub>5</sub>	F <sub>2</sub>			
5											C <sub>2</sub>	C <sub>3</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	L <sub>3</sub>								
6											C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>3</sub>	L <sub>4</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>			
7													C <sub>1</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>3</sub>	L <sub>3</sub>	F <sub>5</sub>		F <sub>1</sub>			F <sub>1</sub>			
8			F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>1</sub>							H <sub>1</sub>	C <sub>2</sub>	HC <sub>21</sub>	C <sub>1</sub>	C <sub>1</sub>	L <sub>3</sub>		F <sub>2</sub>	F <sub>7</sub>	F <sub>2</sub>	F <sub>1</sub>			
9	F <sub>2</sub>		F <sub>2</sub>				F <sub>2</sub>					C <sub>1</sub>	C <sub>1</sub>	C <sub>3</sub>	C <sub>2</sub>	C <sub>2</sub>	C <sub>2</sub>	L <sub>2</sub>	F <sub>4</sub>	F <sub>7</sub>	F <sub>1</sub>					
10							F <sub>7</sub>	L <sub>6</sub>	L <sub>2</sub>			H <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>			L <sub>1</sub>				F <sub>1</sub>	F <sub>2</sub>			
11													C <sub>1</sub>	C <sub>4</sub>		C <sub>3</sub>	C <sub>5</sub>	C <sub>5</sub>	FF <sub>51</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>				
12											H <sub>2</sub>		C <sub>2</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>5</sub>	L <sub>3</sub>	L <sub>5</sub>	F <sub>6</sub>	F <sub>4</sub>	F <sub>2</sub>			F <sub>1</sub>		
13	F <sub>2</sub>	F <sub>4</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>2</sub>								L <sub>2</sub>	L <sub>2</sub>	HL <sub>11</sub>	CL <sub>11</sub>	CL <sub>22</sub>	C <sub>1</sub>		F <sub>4</sub>	F <sub>5</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>2</sub>		
14	F <sub>5</sub>	F <sub>3</sub>		F <sub>2</sub>	F <sub>1</sub>						C <sub>2</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>4</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>		
15														C <sub>2</sub>	C <sub>3</sub>	L <sub>2</sub>			F <sub>1</sub>			F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>		
16		F <sub>1</sub>				F <sub>1</sub>									L <sub>2</sub>	L <sub>1</sub>		L <sub>3</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>1</sub>	F <sub>1</sub>				
17		F <sub>1</sub>	F <sub>1</sub>		F <sub>2</sub>								H <sub>1</sub>	H <sub>1</sub>	C <sub>1</sub>	C <sub>3</sub>	C <sub>5</sub>	C <sub>3</sub>	F <sub>3</sub>	F <sub>5</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>7</sub>		
18	F <sub>7</sub>	F <sub>5</sub>	F <sub>7</sub>	F <sub>5</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>					C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>4</sub>	C <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	F <sub>4</sub>				F <sub>1</sub>			
19		F <sub>2</sub>	F <sub>5</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>3</sub>	F <sub>1</sub>		LC <sub>11</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>4</sub>	C <sub>4</sub>	C <sub>3</sub>	L <sub>1</sub>	F <sub>1</sub>	F <sub>3</sub>	F <sub>2</sub>	F <sub>4</sub>	F <sub>4</sub>	F <sub>3</sub>		
20	F <sub>1</sub>							F <sub>3</sub>	L <sub>2</sub>			C <sub>1</sub>	C <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>4</sub>	F <sub>1</sub>		
21									L <sub>1</sub>	L <sub>1</sub>	H <sub>1</sub>	H <sub>2</sub>	C <sub>1</sub>	C <sub>1</sub>	C <sub>1</sub>	L <sub>2</sub>	L <sub>4</sub>	L <sub>3</sub>	F <sub>8</sub>	F <sub>8</sub>	F <sub>2</sub>					
22			F <sub>2</sub>	F <sub>5</sub>	F <sub>3</sub>	F <sub>1</sub>									C <sub>2</sub>	L <sub>3</sub>	L <sub>3</sub>	L <sub>4</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>	F <sub>2</sub>				
23					F <sub>1</sub>	F <sub>1</sub>	F <sub>3</sub>	F <sub>2</sub>	L <sub>1</sub>				C <sub>2</sub>	C <sub>1</sub>		L <sub>4</sub>	L <sub>3</sub>				F <sub>3</sub>	F <sub>5</sub>	F <sub>4</sub>	F <sub>3</sub>		
24		F <sub>2</sub>			F <sub>1</sub>								H <sub>2</sub>	C <sub>1</sub>	C <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	F <sub>1</sub>	F <sub>4</sub>	F <sub>1</sub>	F <sub>1</sub>				
25							F <sub>1</sub>	F <sub>1</sub>	L <sub>1</sub>				C <sub>2</sub>	C <sub>4</sub>	L <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>			F <sub>1</sub>	F <sub>2</sub>	F <sub>1</sub>				
26			F <sub>1</sub>			F <sub>3</sub>	F <sub>1</sub>	F <sub>1</sub>	L <sub>2</sub>	H <sub>2</sub>	H <sub>3</sub>	H <sub>1</sub>	C <sub>3</sub>	C <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>2</sub>	L <sub>1</sub>		F <sub>1</sub>						
27								F <sub>1</sub>		L <sub>1</sub>	L <sub>1</sub>		H <sub>1</sub>	C <sub>4</sub>	C <sub>3</sub>	C <sub>1</sub>			F <sub>5</sub>	F <sub>6</sub>	FF <sub>52</sub>	F <sub>6</sub>	F <sub>2</sub>	F <sub>1</sub>		
28	F <sub>3</sub>	F <sub>5</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>1</sub>								L <sub>1</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>	CL <sub>11</sub>	F <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>1</sub>				
29					F <sub>2</sub>	F <sub>1</sub>	F <sub>1</sub>	F <sub>2</sub>	L <sub>2</sub>	L <sub>1</sub>						C <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>3</sub>	F <sub>1</sub>	F <sub>2</sub>			
30					F <sub>1</sub>								C <sub>1</sub>	C <sub>1</sub>	L <sub>1</sub>	C <sub>1</sub>	L <sub>1</sub>	L <sub>1</sub>	F <sub>3</sub>	F <sub>1</sub>						
31		F <sub>1</sub>											LH <sub>11</sub>	LH <sub>11</sub>	L <sub>2</sub>	L <sub>1</sub>		L <sub>1</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	FF <sub>22</sub>	F <sub>1</sub>			
CNT																										
MED																										
UQ																										
LQ																										

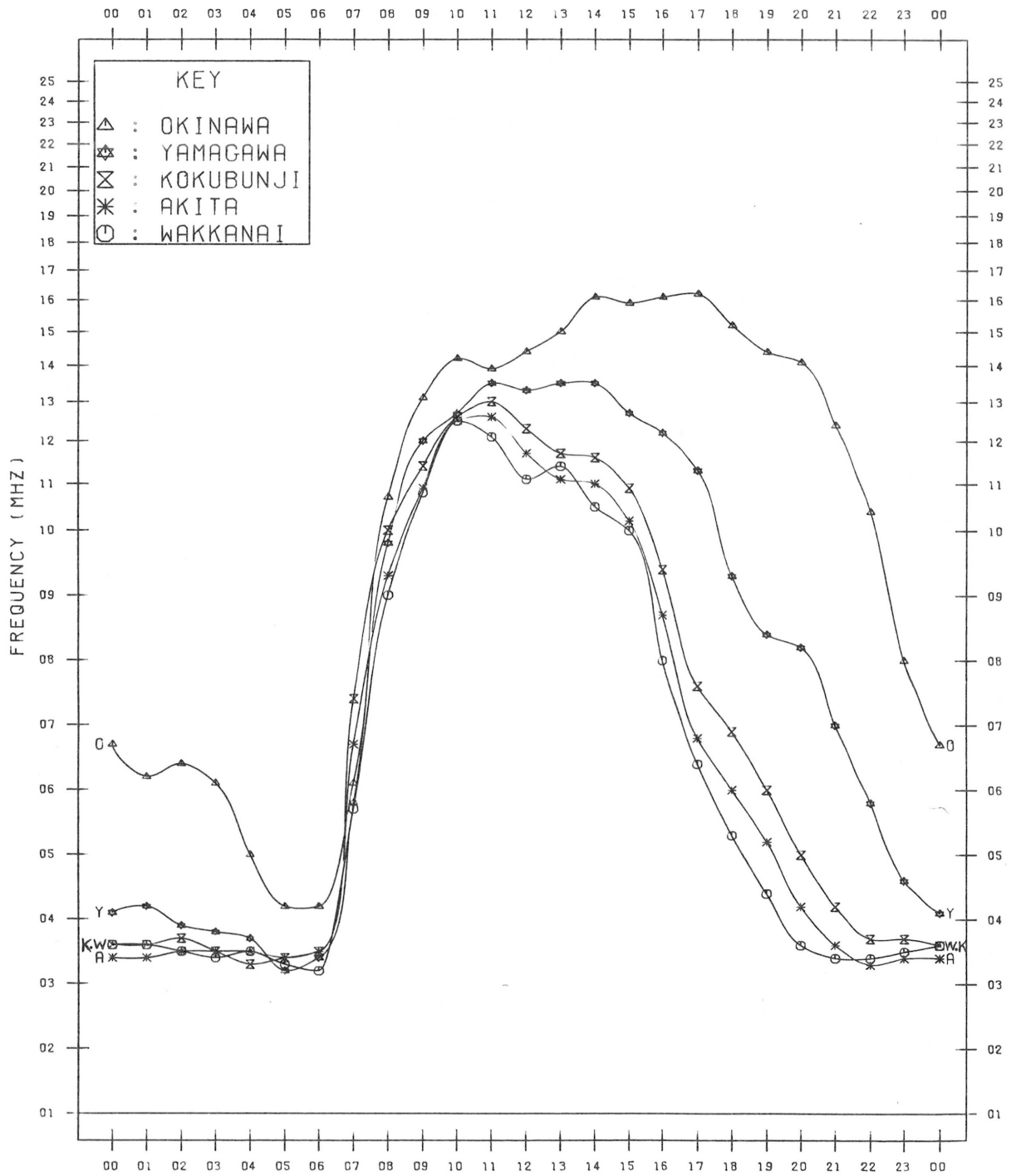
DEC. 1982

TYPES OF ES

# MONTHLY MEDIAN VALUES OF FOF2

135 °E MEAN TIME

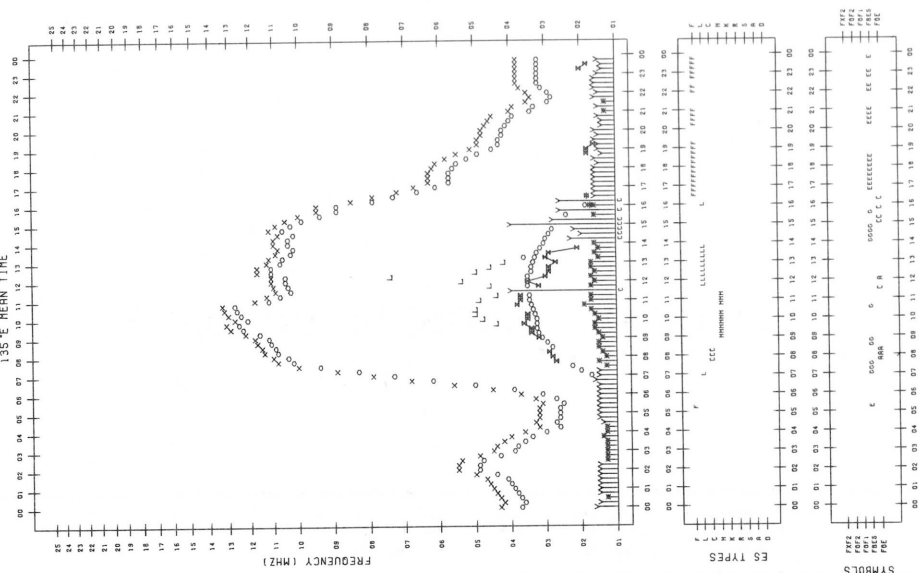
DEC. 1982



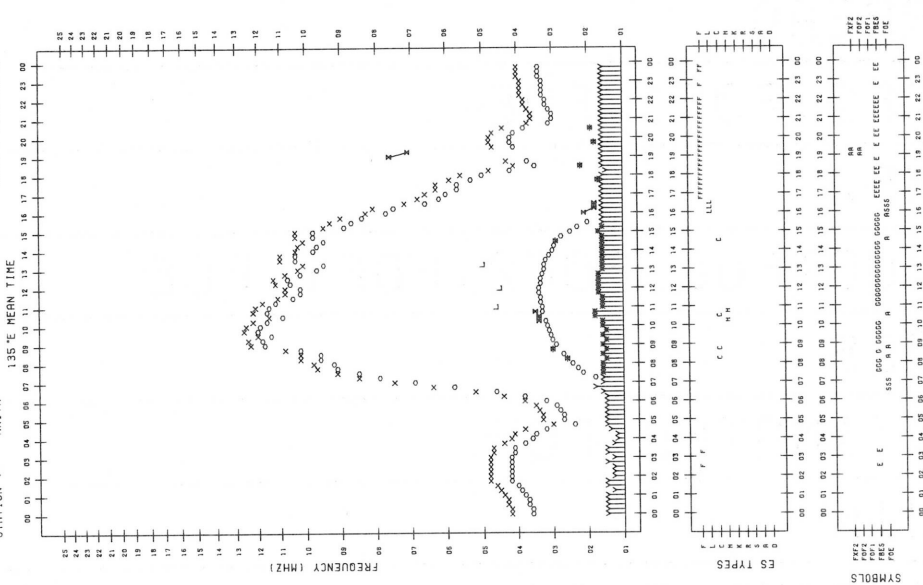
*f*-PLOTS OF IONOSPHERIC DATA

KEY OF F-PLOT	
I	SPREAD
○	FOF2, FOF1, F0E
×	FXF2
*	DOUBTFUL FOF2, FOF1, F0E
⊗	FBES
L	ESTIMATED FOF1
*.Y	FMIN
^	GREATER THAN
v	LESS THAN

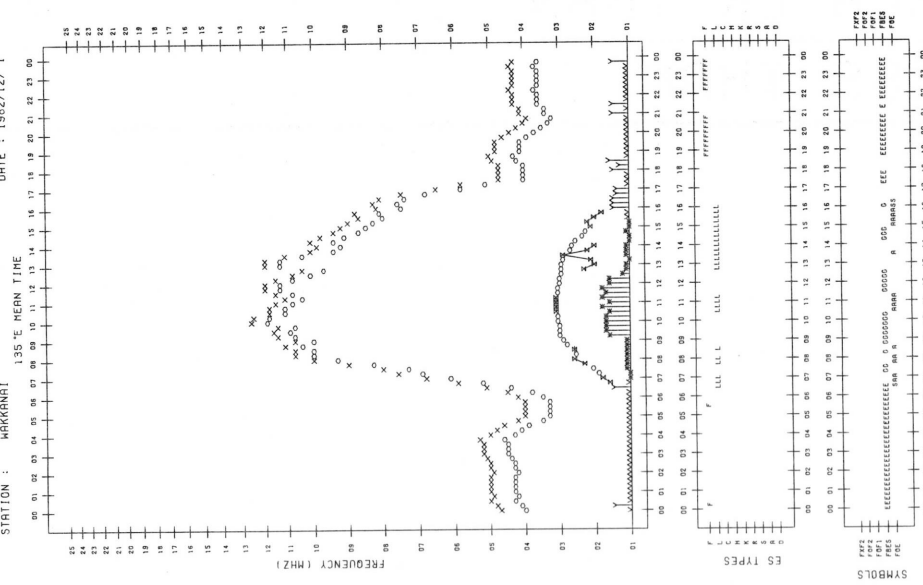
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S.HIDOME  
DATE : 1982/12/1



F-PLOT DATA  
STATION : AKITA  
SCALER : T.MORI  
DATE : 1982/12/1

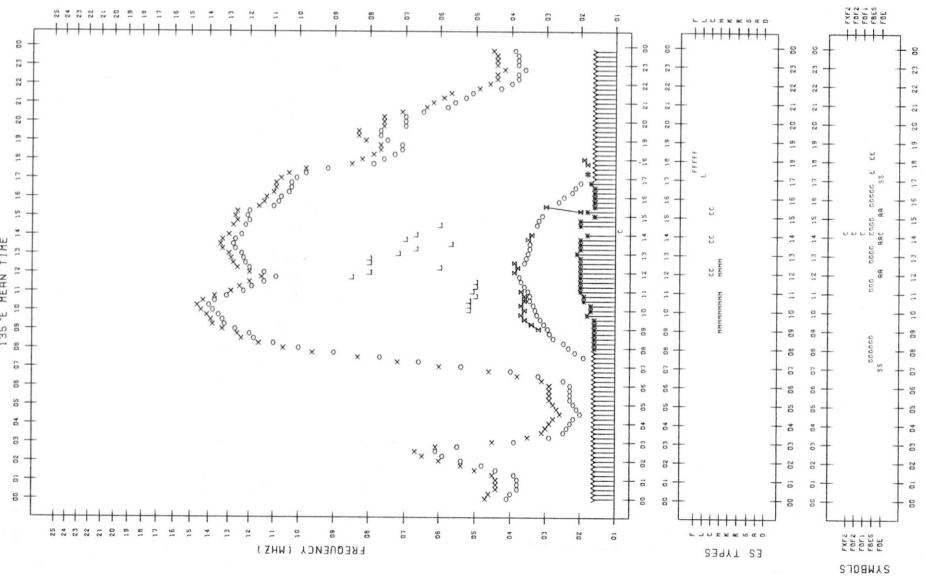


F-PLOT DATA  
STATION : WAKKANAI  
SCALER : T.ODA  
DATE : 1982/12/1



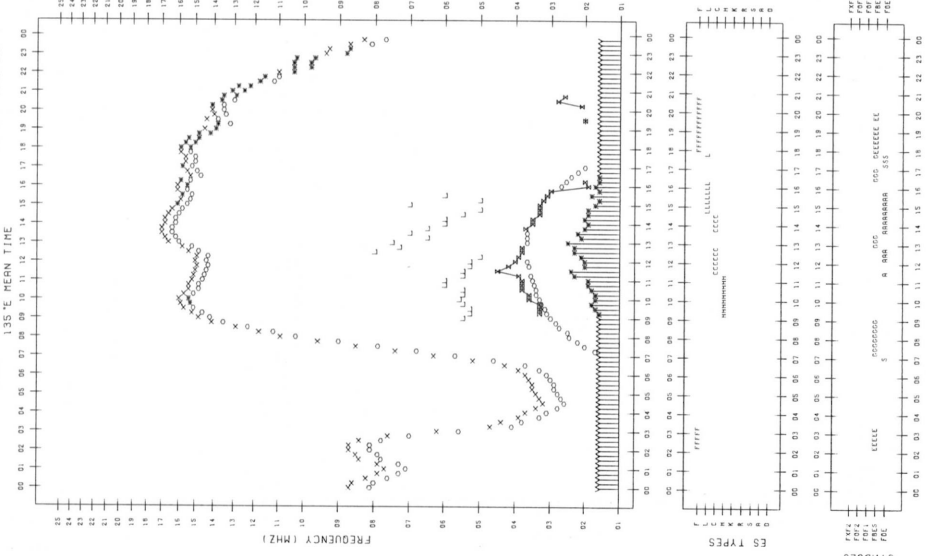
F-PLOT DATA

STATION : YAMAGAWA SCALER : I. NISHIMURA DATE : 1982/12/ 1



F-PLOT DATA

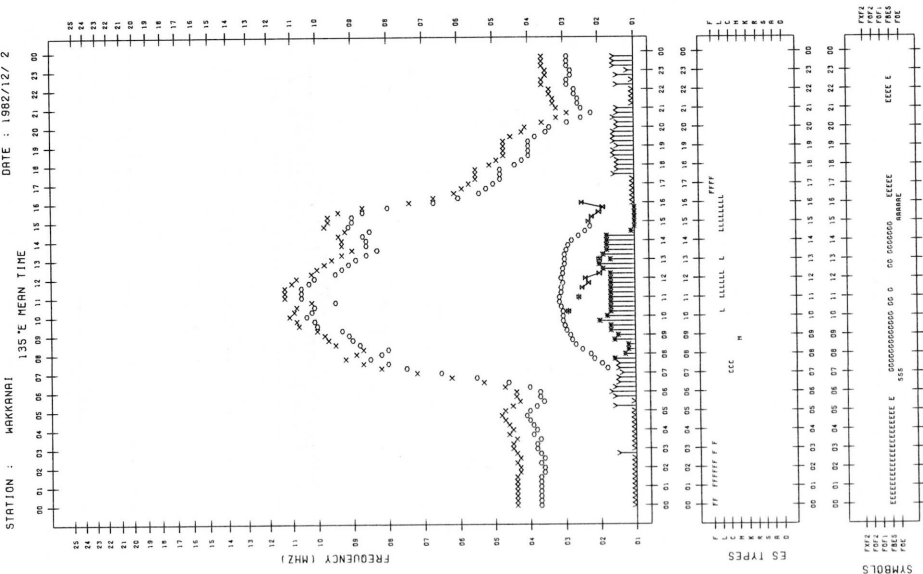
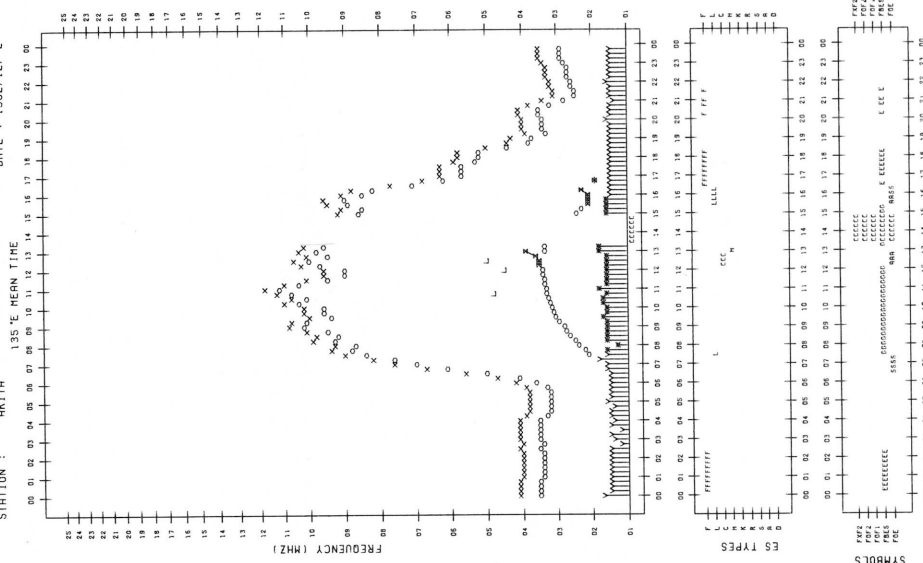
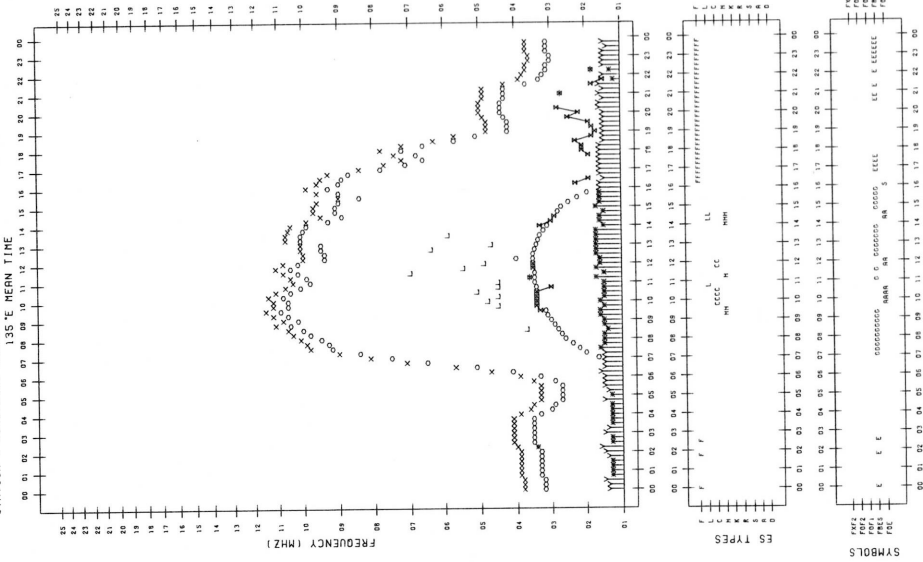
STATION : OKINAWA SCALER : K. WAKABAYASHI DATE : 1982/12/ 1



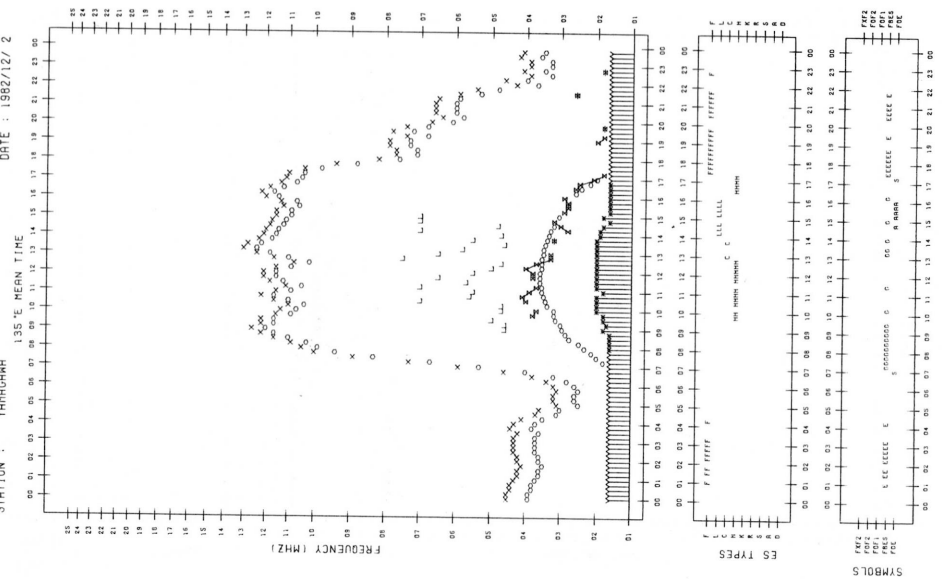
STATION : KOKUBUNJI TOKYO  
135°E MEAN TIME  
SCALER : S.HIIDOME  
DATE : 1982/12/ 2

STATION : AKITA  
135°E MEAN TIME  
SCALER : T.ECHIZENYA  
DATE : 1982/12/ 2

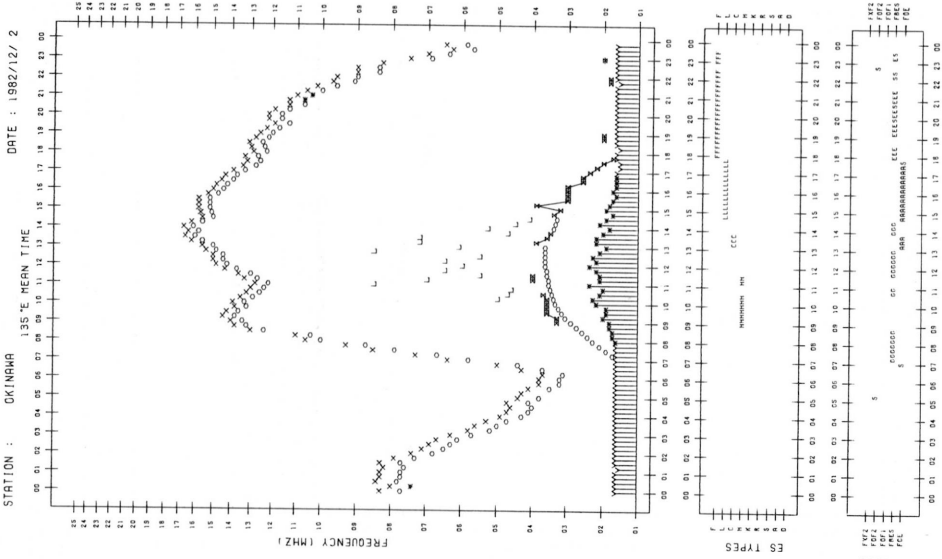
STATION : WAKKANAI  
135°E MEAN TIME  
SCALER : T.GOR  
DATE : 1982/12/ 2



STATION : YAMAGUCHI SCALER : T. NISHIMURA DATE : 1982/12/ 2



STATION : OKINAWA SCALER : H. MENDO DATE : 1982/12/ 2

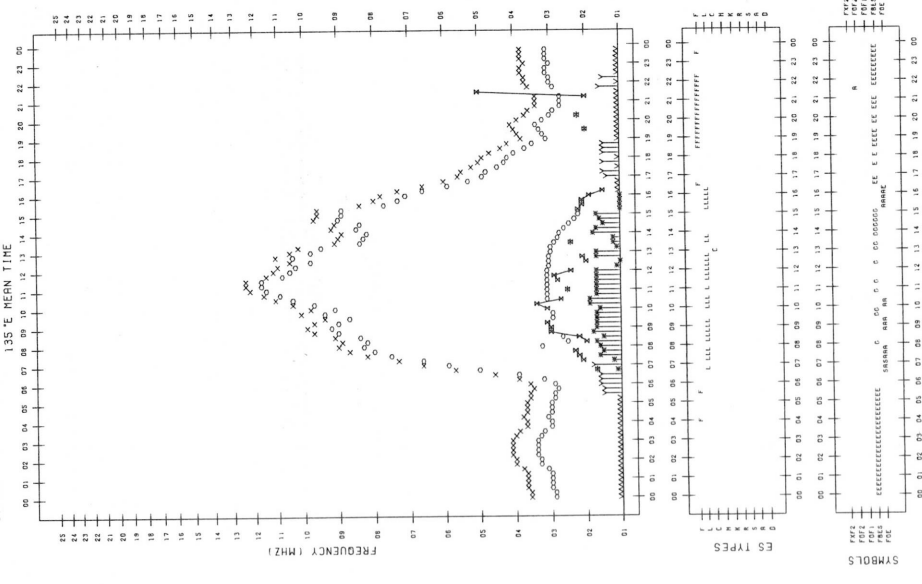
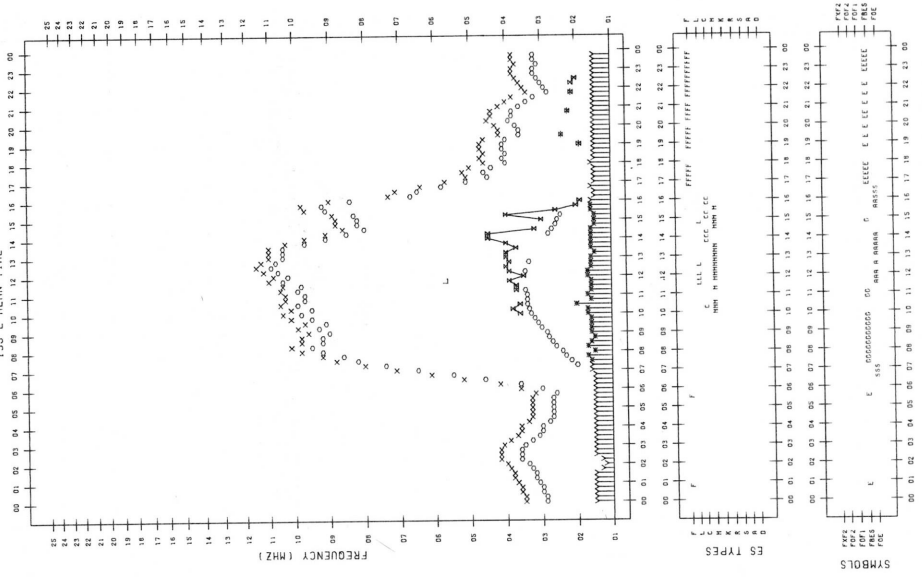
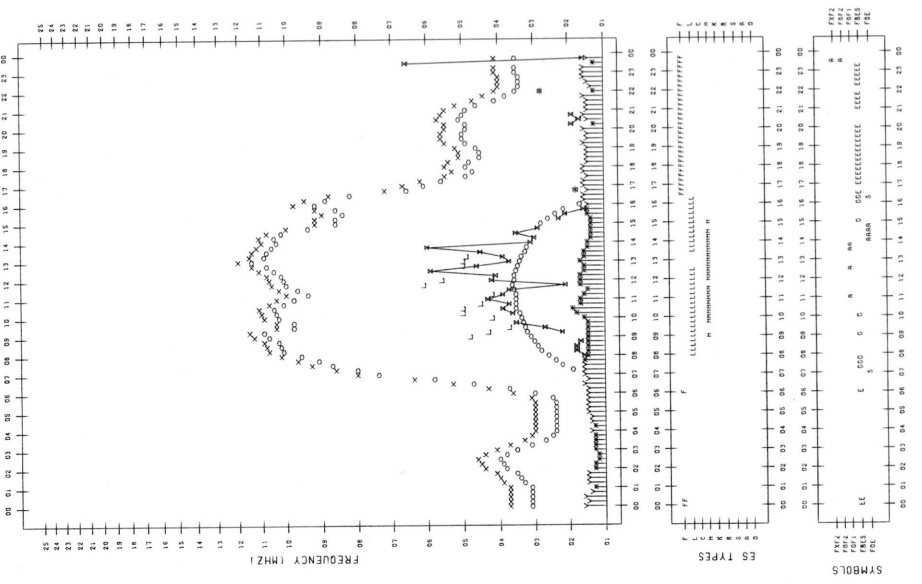




STATION : KOKUBUNJI TOKYO  
 SCALER : S.HIIDONE  
 DATE : 1982/12/ 3  
 135°E MEAN TIME

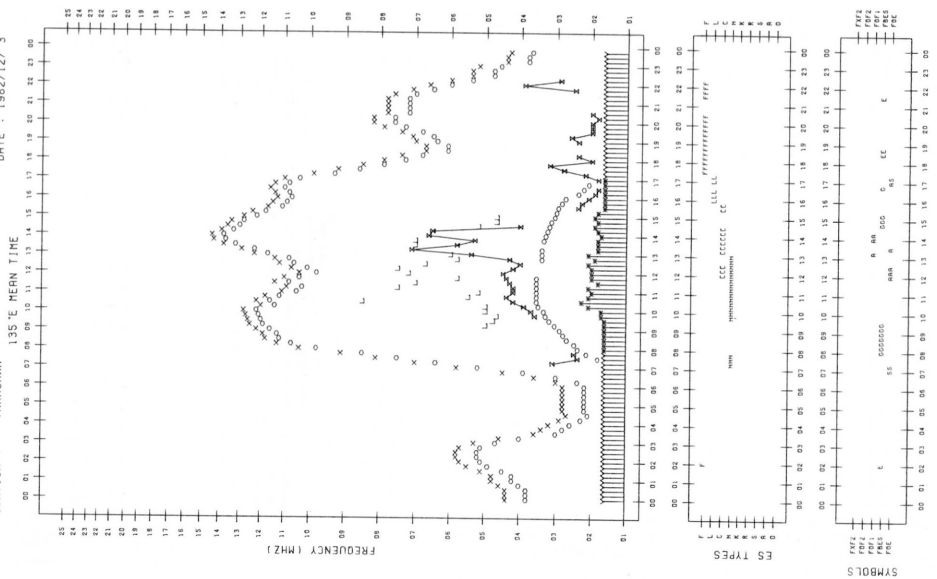
STATION : AKITA  
 SCALER : Y.ECHIZENYA  
 DATE : 1982/12/ 3  
 135°E MEAN TIME

STATION : MAKINAMI  
 SCALER : T.ODA  
 DATE : 1982/12/ 3  
 135°E MEAN TIME



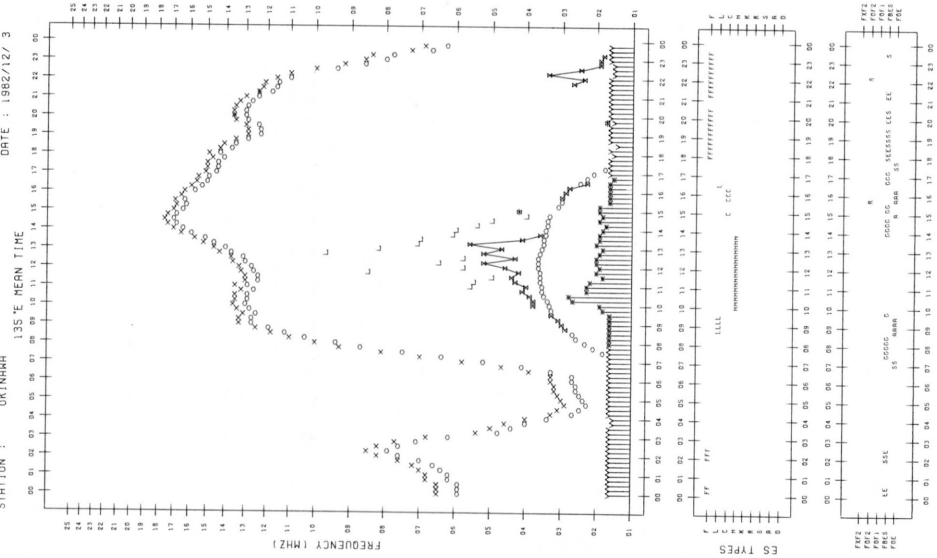
F- PLOT DATA

STATION : YAMAGAWA SCALER : I-NISHIMUTA DATE : 1982/12/3



F- PLOT DATA

STATION : OKINAWA SCALER : H-MENDO DATE : 1982/12/3

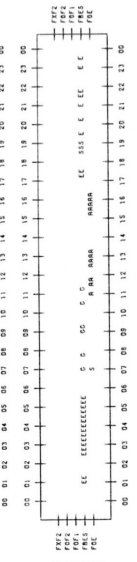
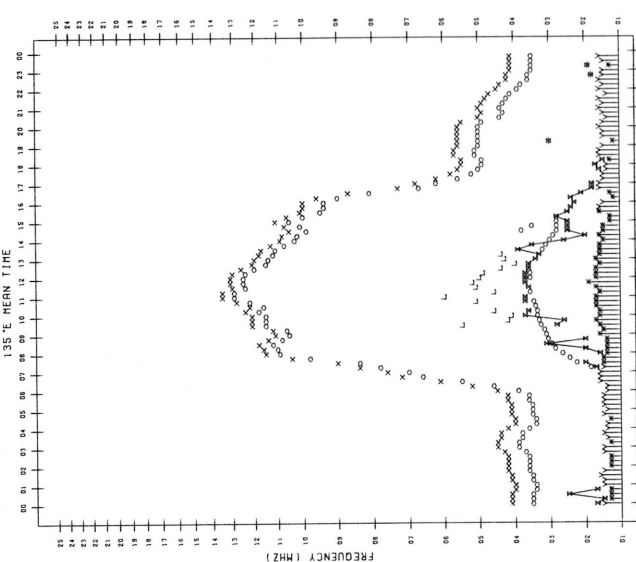


F-PLOT DATA

STATION : KOKUBUNJI TOKYO

SCALER : S.HIJDOME

DATE : 1982/12/ 4

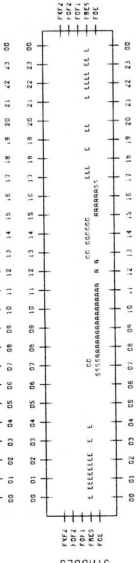
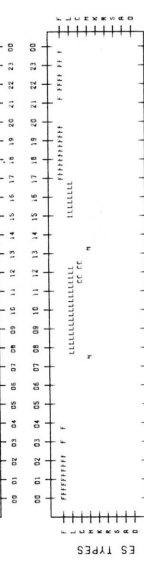
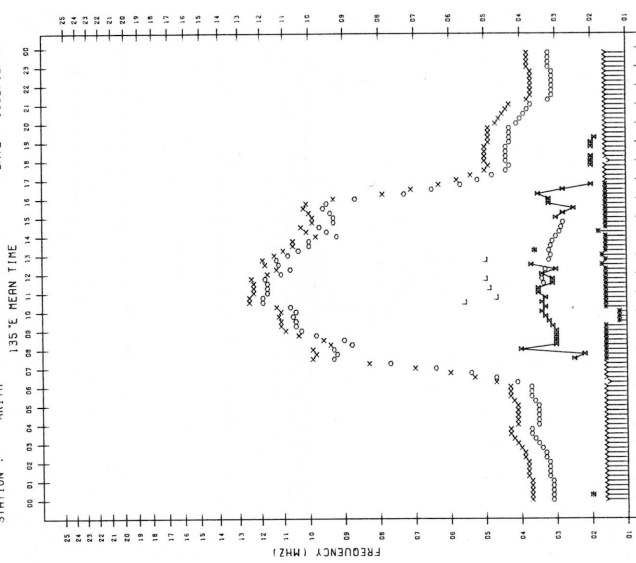


F-PLOT DATA

STATION : AKITA

SCALER : T.MORI

DATE : 1982/12/ 4

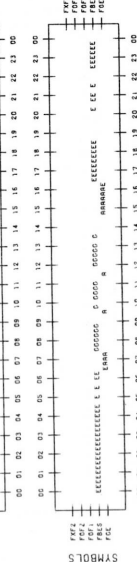
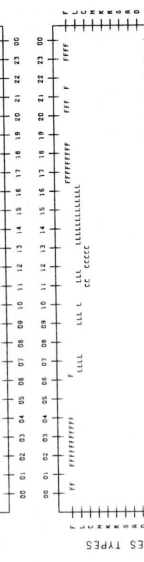
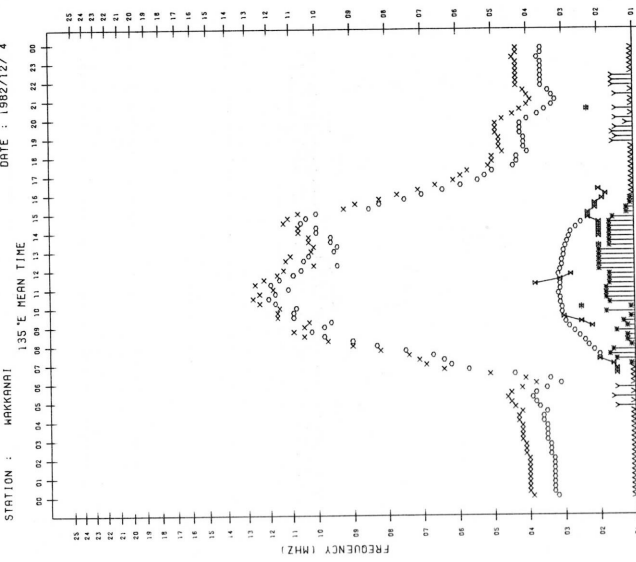


F-PLOT DATA

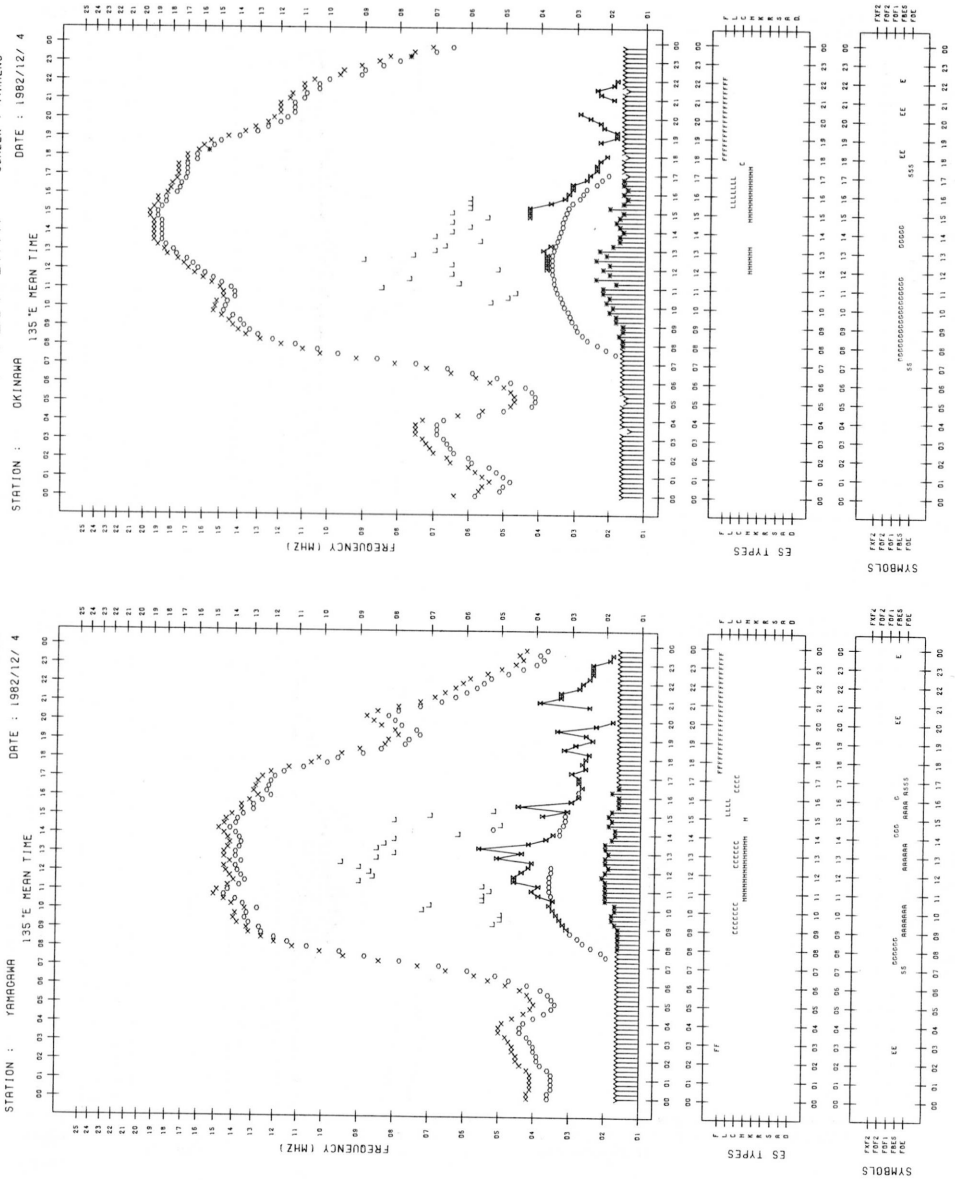
STATION : WAKKANAI

SCALER : T.ODAI

DATE : 1982/12/ 4

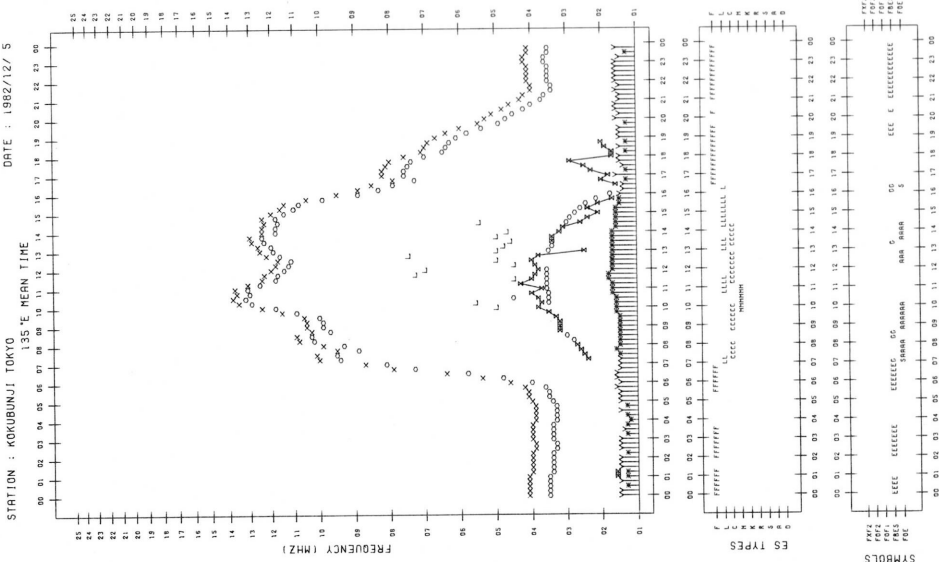


F- PLOT DATA  
STATION : YABOARAH  
SCALER : I. NISHIMURA  
DATE : 1982/12/ 4  
135°E MEAN TIME

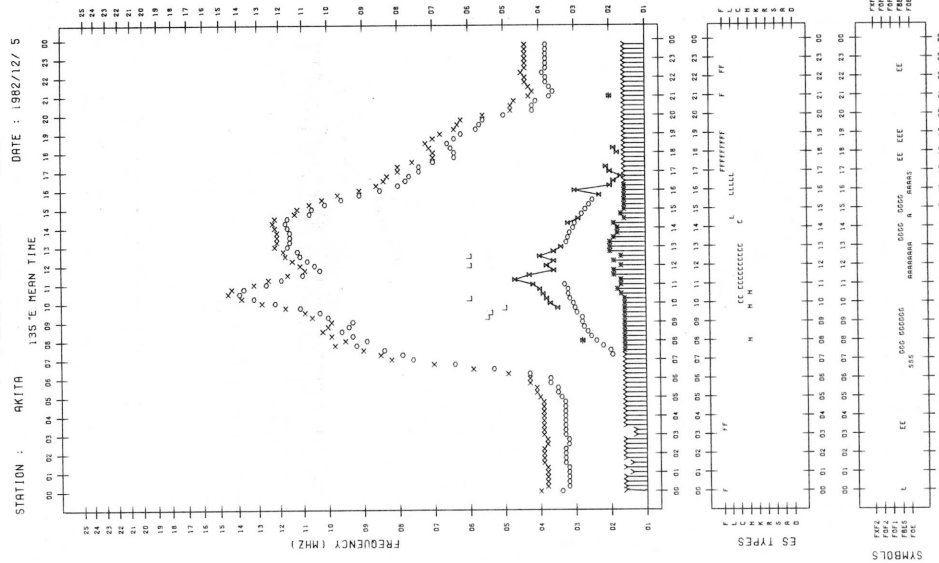


F- PLOT DATA  
STATION : OKINAWA  
SCALER : H. MENO  
DATE : 1982/12/ 4  
135°E MEAN TIME

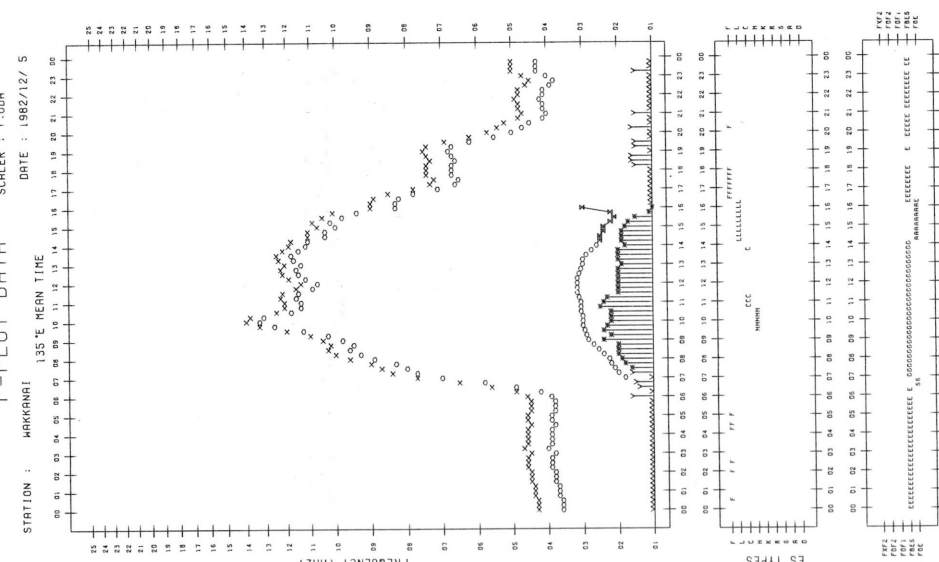
F-PLOT DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIIDORE  
 DATE : 1982/12/ 5  
 135°E MEAN TIME



F-PLOT DATA  
 STATION : AKITA  
 SCALER : T-MORI  
 DATE : 1982/12/ 5  
 135°E MEAN TIME

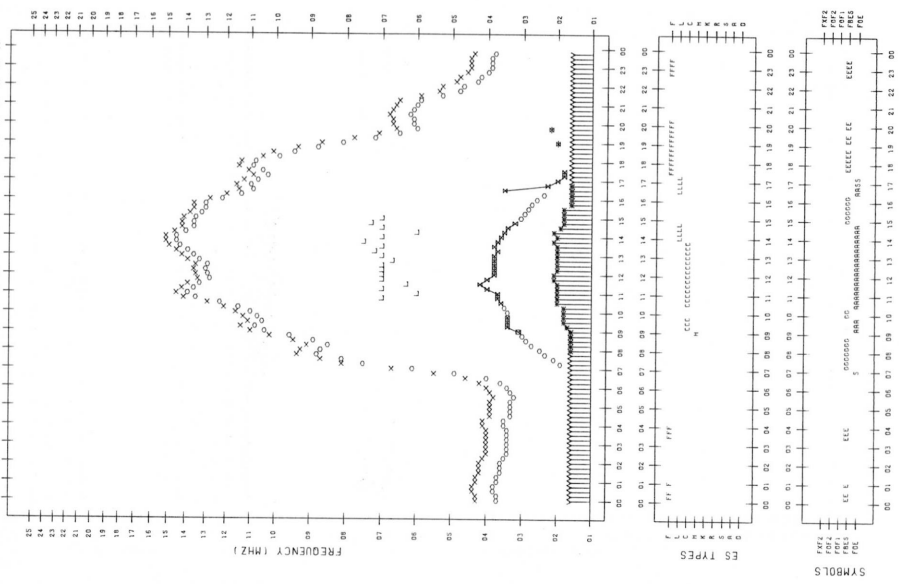


F-PLOT DATA  
 STATION : WAKKANAI  
 SCALER : T-ODA  
 DATE : 1982/12/ 5  
 135°E MEAN TIME



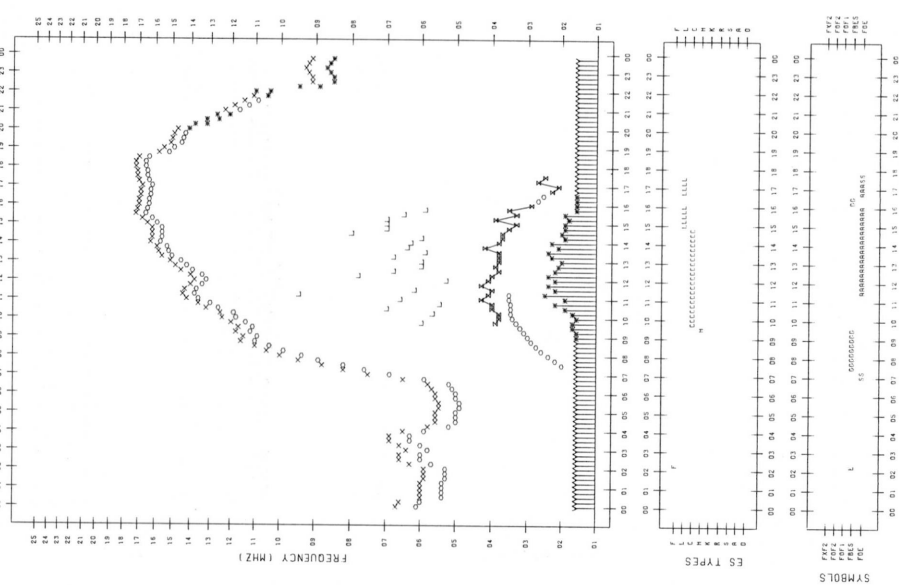
F- PLOT DATA

STATION : YAMAGUCHI SCALER : I-NISHIMURA DATE : 1982/12/5



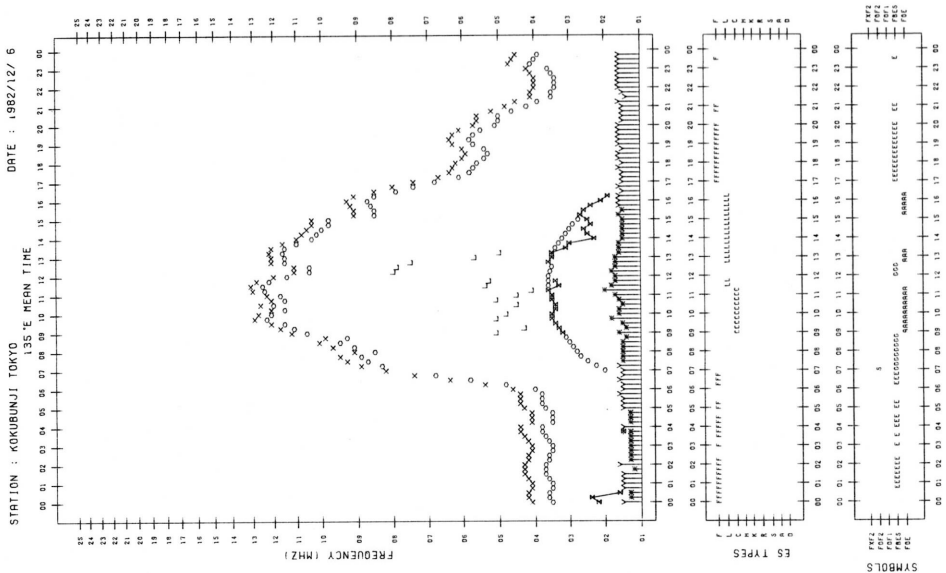
F- PLOT DATA

STATION : OKINAWA SCALER : A-OTSUKA DATE : 1982/12/5



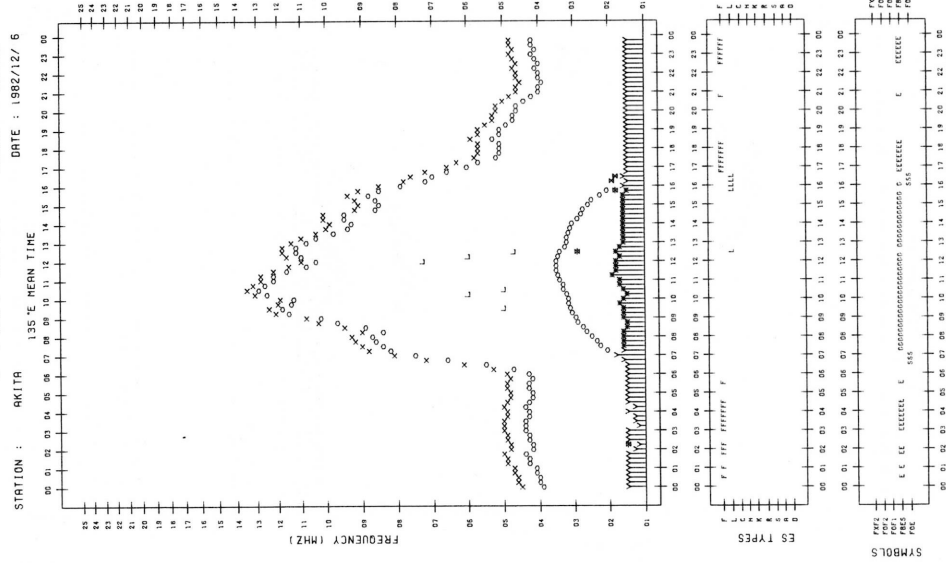
F- PLOT DATA

STATION : KOKUBUNJ TOKYO SCALER : S-HI100HE DATE : 1982/12/ 6



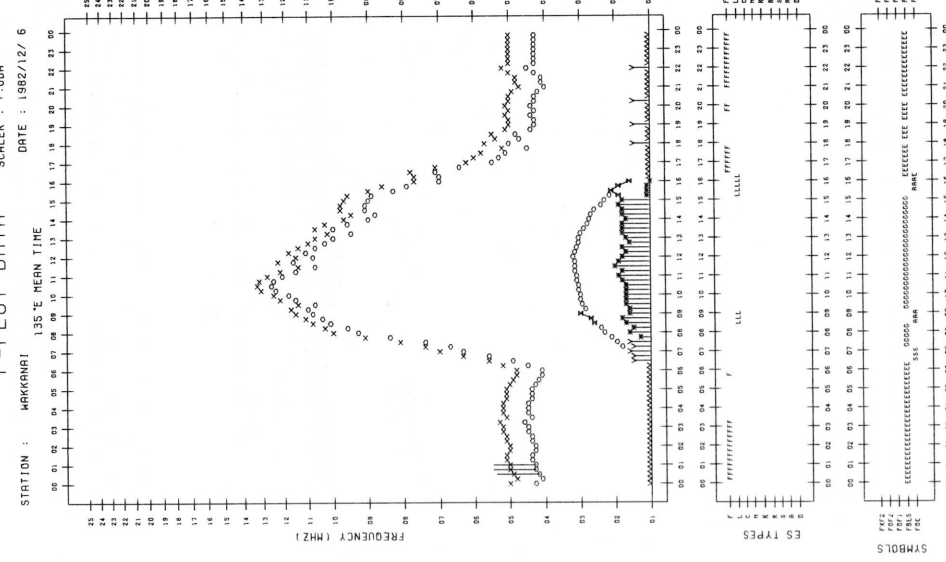
F- PLOT DATA

STATION : AKITA SCALER : Y-ECHIZENYA DATE : 1982/12/ 6



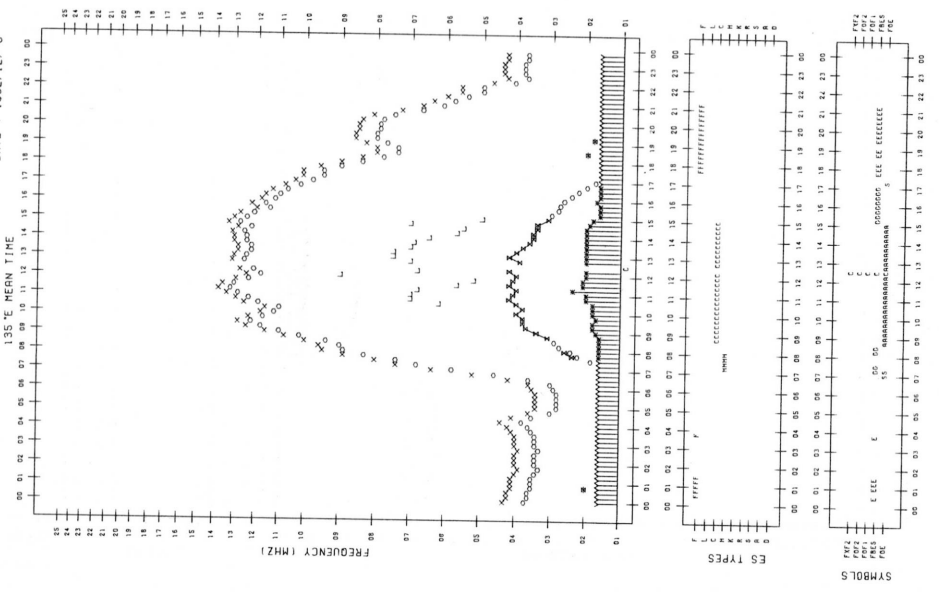
F- PLOT DATA

STATION : WAKKANAI SCALER : T-00A DATE : 1982/12/ 6



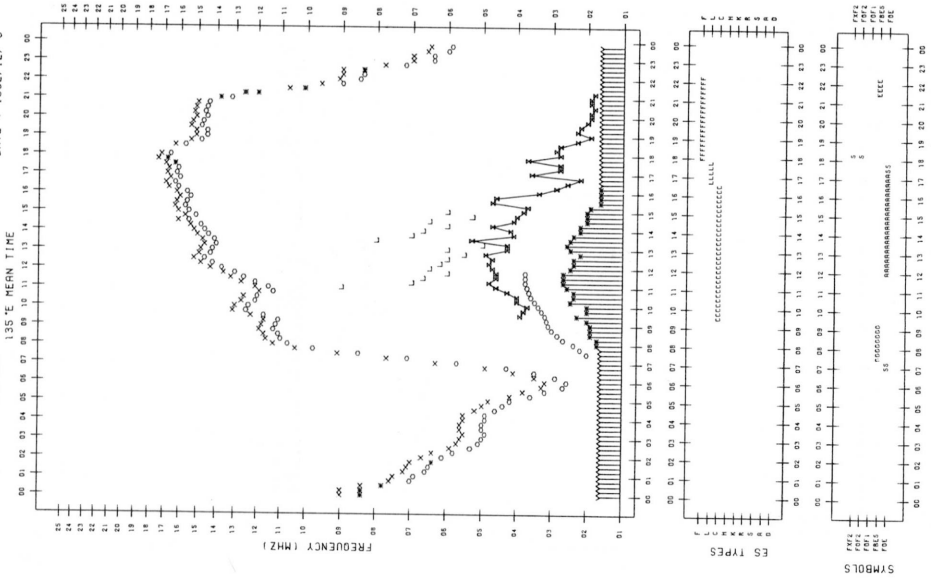
F-PLOT DATA

STATION : YAMAGUCHI SCALER : T-NISHIMUTA DATE : 1982/12/6



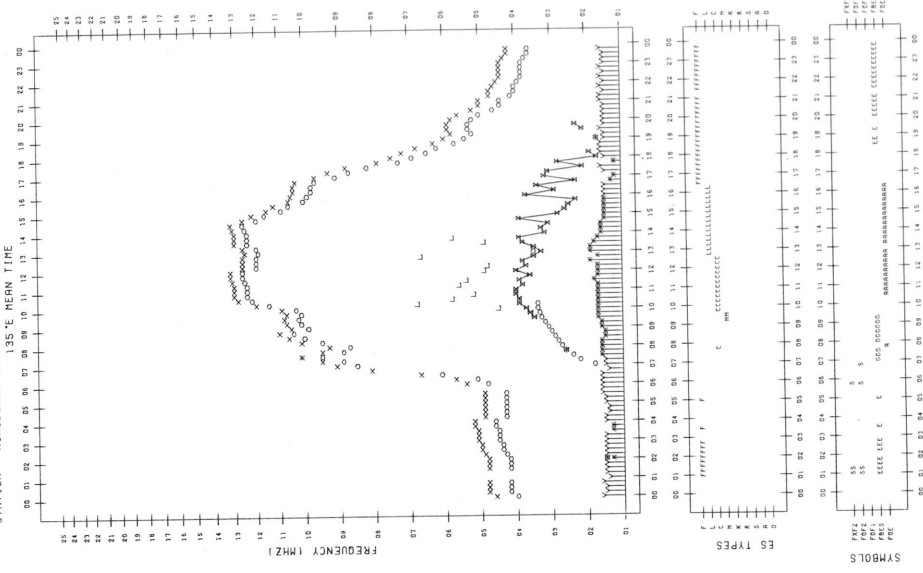
F-PLOT DATA

STATION : OKINAWA SCALER : A-OTSUKA DATE : 1982/12/6

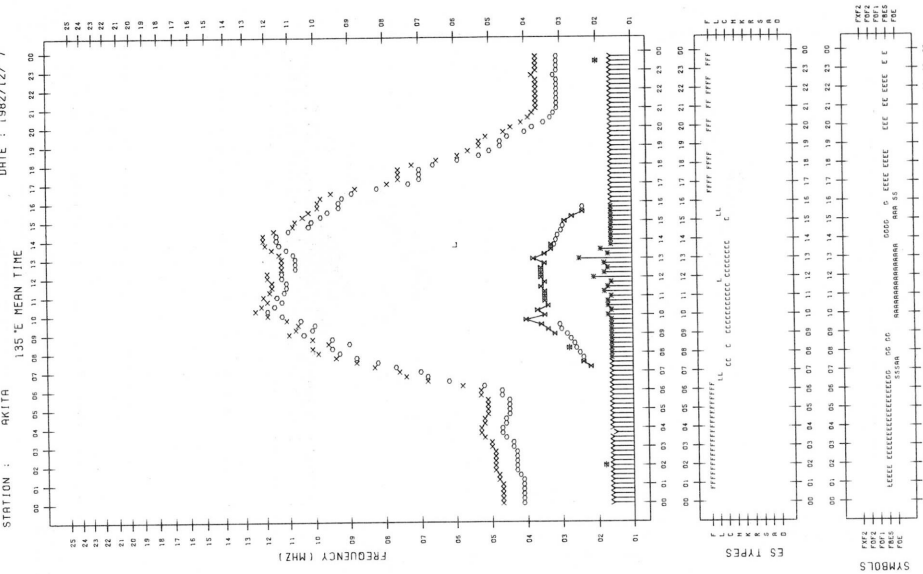




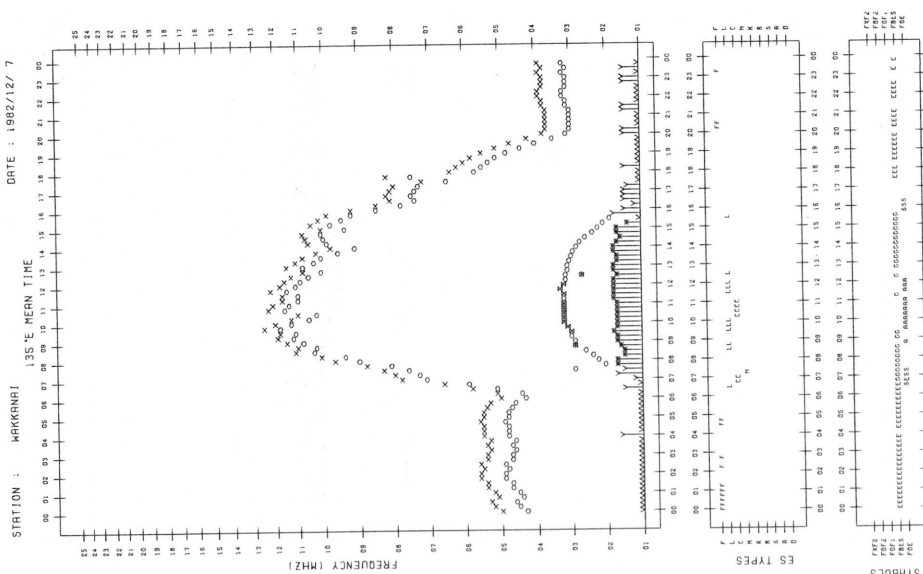
F-PLOT DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIDOME  
 DATE : 1982/12/7  
 135°E MEAN TIME



F-PLOT DATA  
 STATION : AKITA  
 SCALER : T-HORI  
 DATE : 1982/12/7  
 135°E MEAN TIME

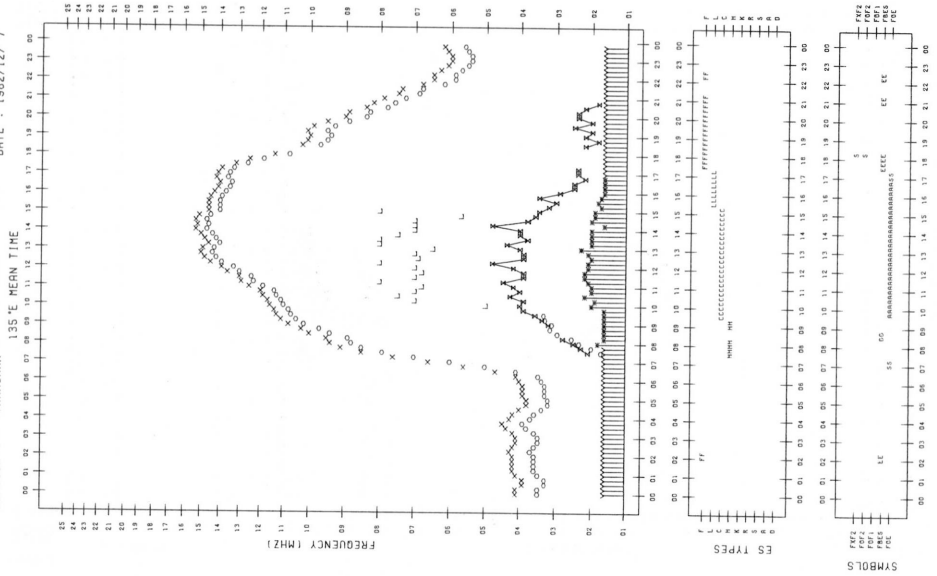


F-PLOT DATA  
 STATION : MAKKANRI  
 SCALER : T-ODA  
 DATE : 1982/12/7  
 135°E MEAN TIME



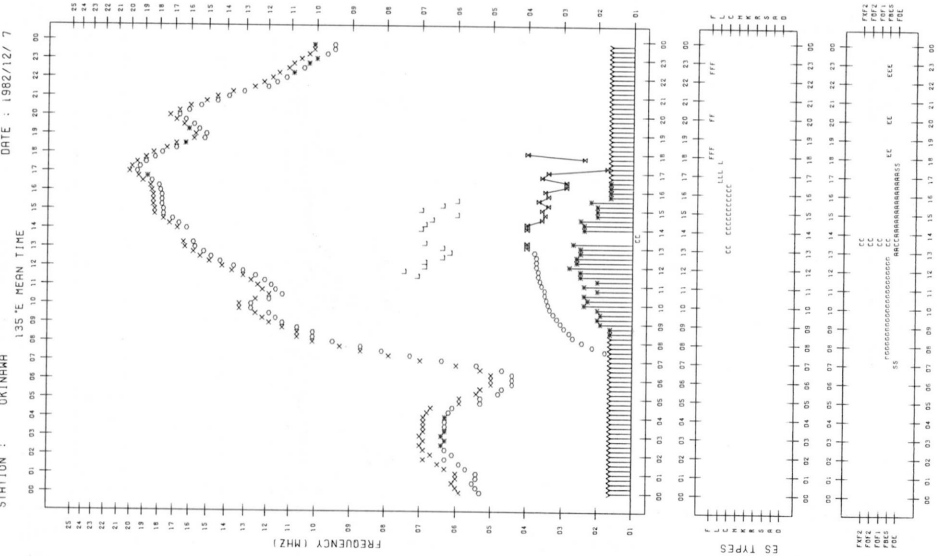
F- PLOT DATA  
STATION : YAHORARA

SCALER : I-NISHIMUTA  
DATE : 1982/12/ 7

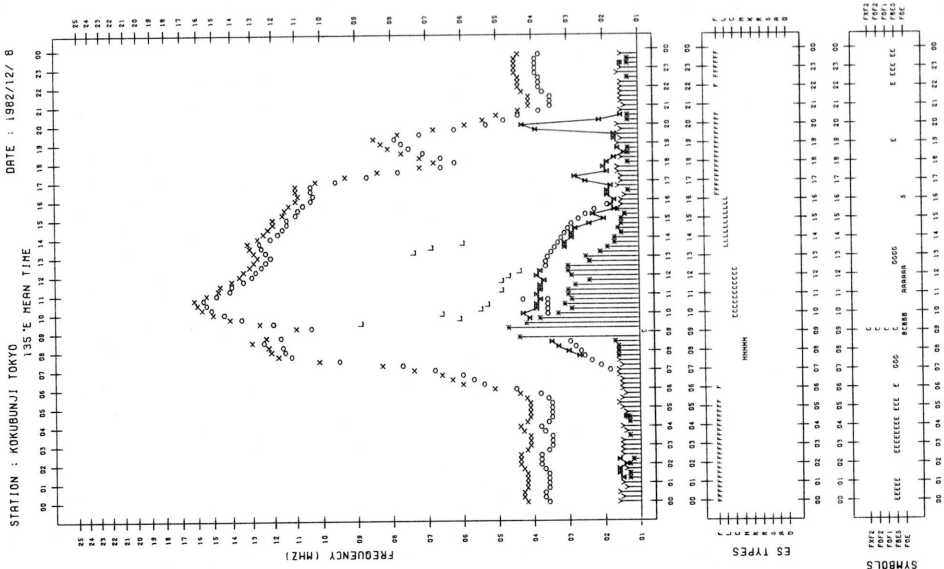


F- PLOT DATA  
STATION : OKINAWA

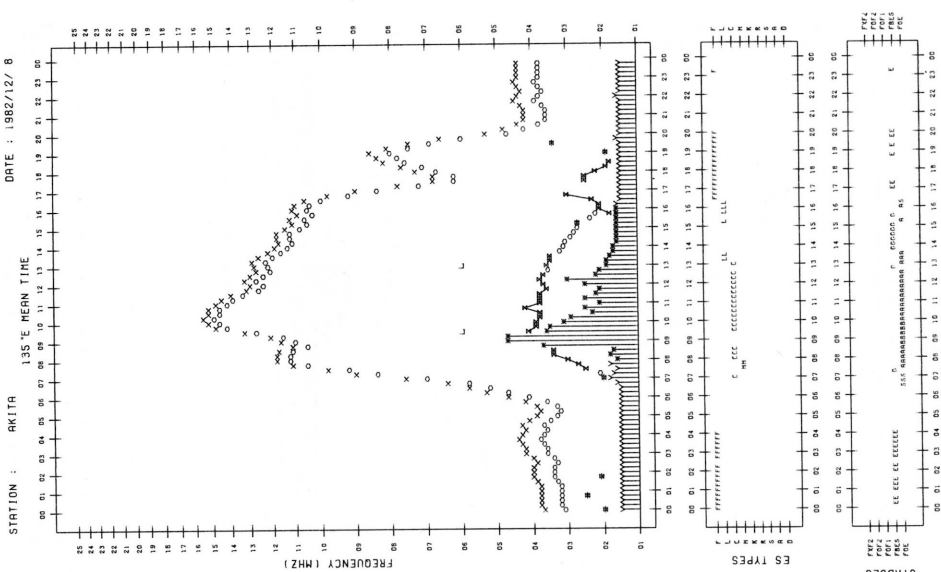
SCALER : A-OTSUKA  
DATE : 1982/12/ 7



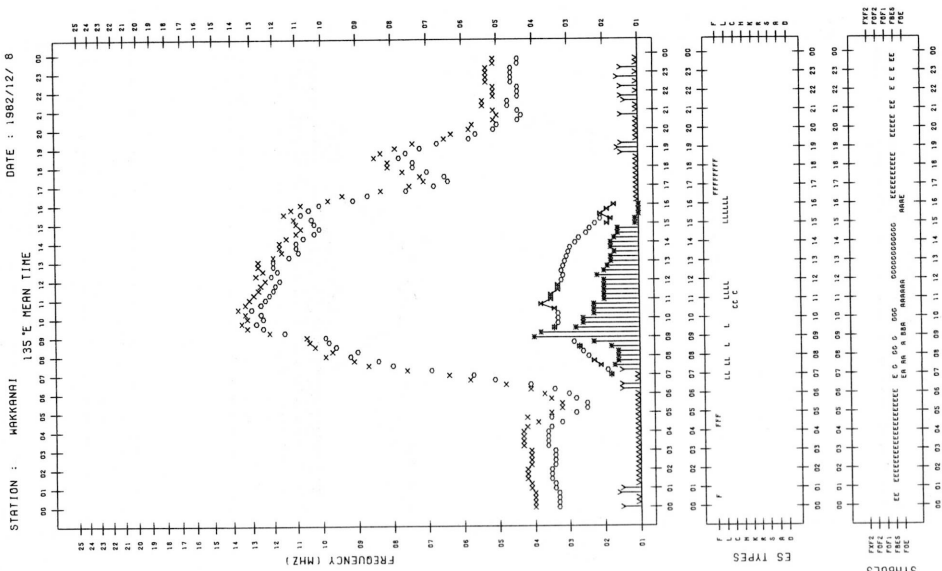
F-plot DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIDOME  
 DATE : 1982/12/ 8



F-plot DATA  
 STATION : AKITA  
 SCALER : Y.ECHIZENYA  
 DATE : 1982/12/ 8



F-plot DATA  
 STATION : WAKKANAI  
 SCALER : T-ODR  
 DATE : 1982/12/ 8

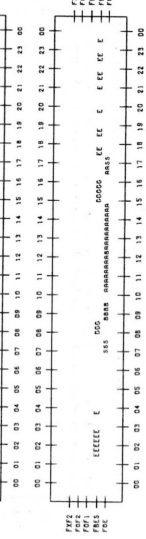
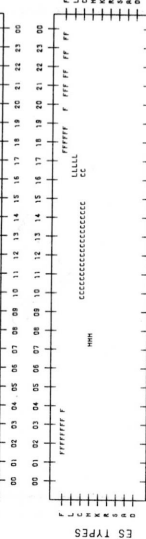
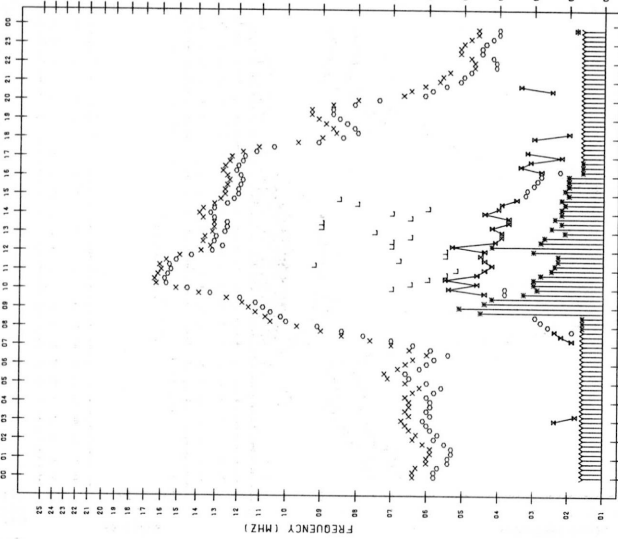


F-PLOT DATA

STATION : YAHAGAWA SCALER : I-NISHIMURA

DATE : 1982/12/8

135°E MEAN TIME

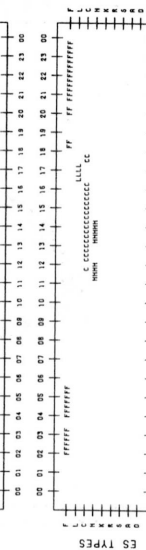
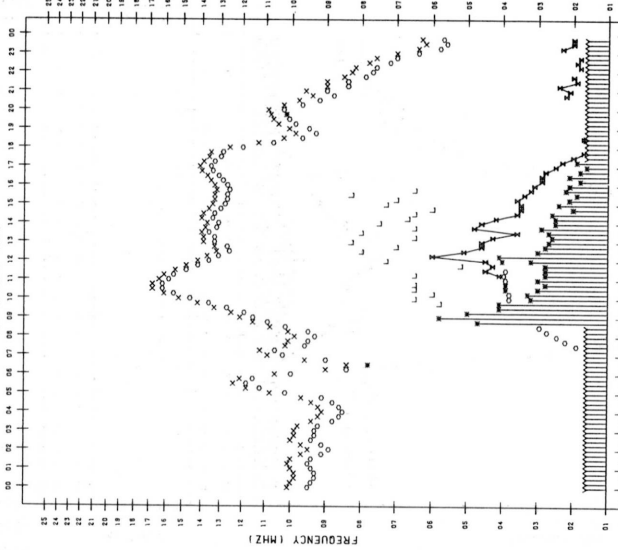


F-PLOT DATA

STATION : OKINAWA SCALER : K-MIKIYAYASHI

DATE : 1982/12/8

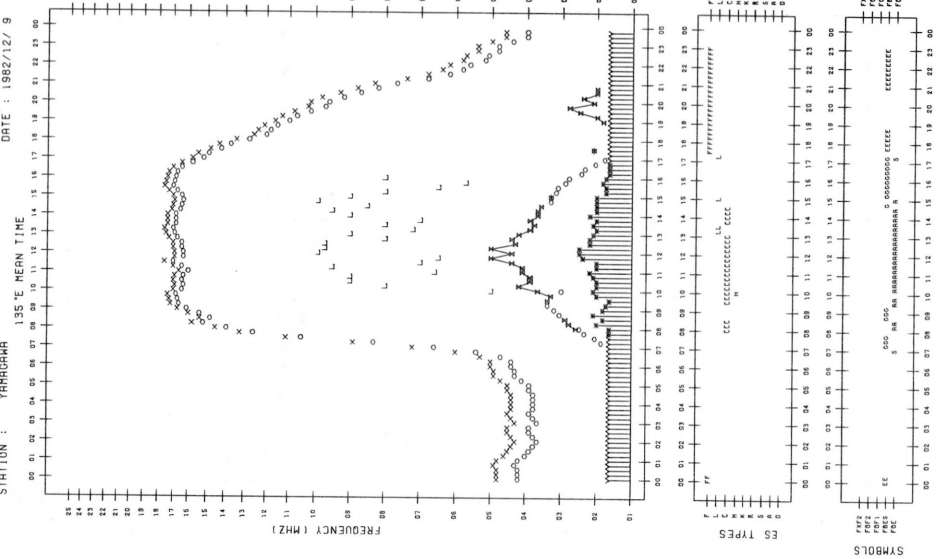
135°E MEAN TIME





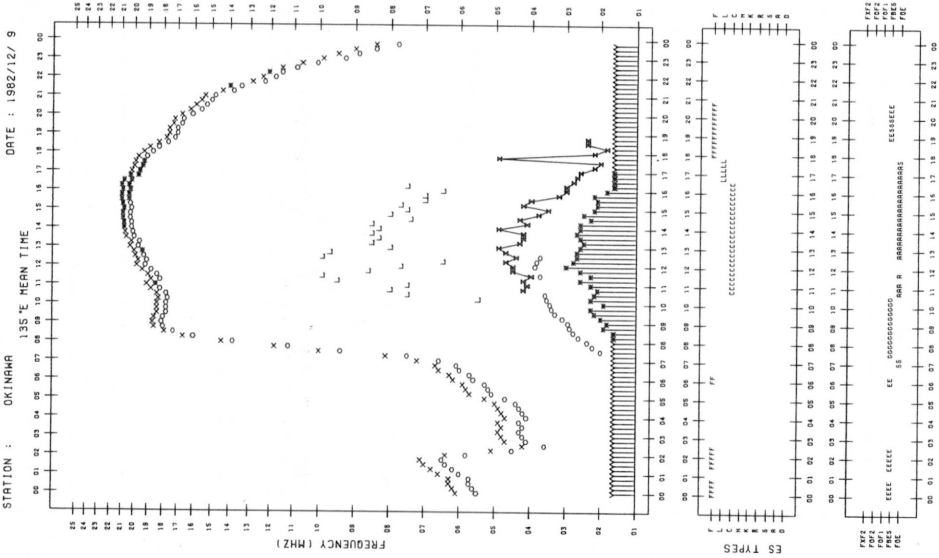
F-PLOT DATA

STATION : YAMAGAWA SCALER : I-NISHIMURA DATE : 1982/12/9

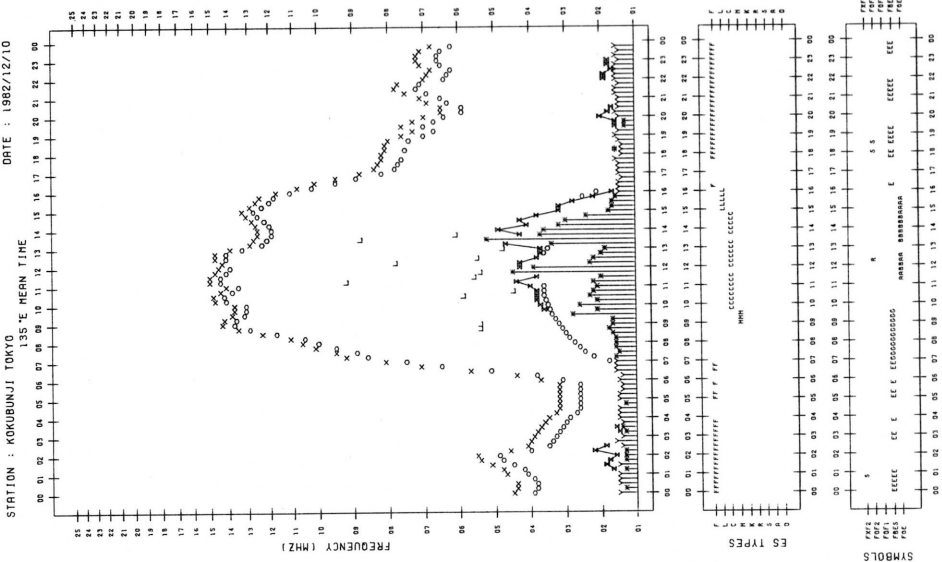


F-PLOT DATA

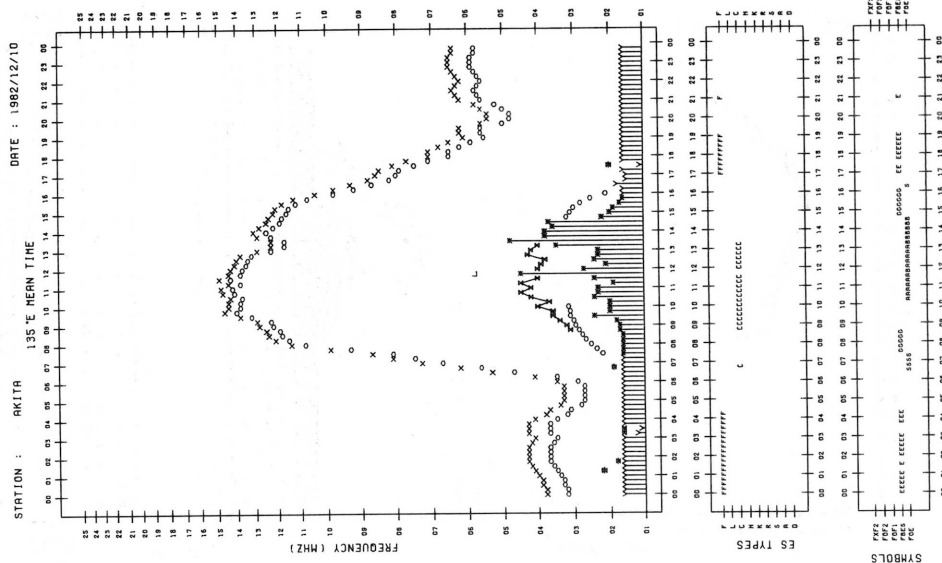
STATION : OKINAWA SCALER : K-MKABAYASHI DATE : 1982/12/9



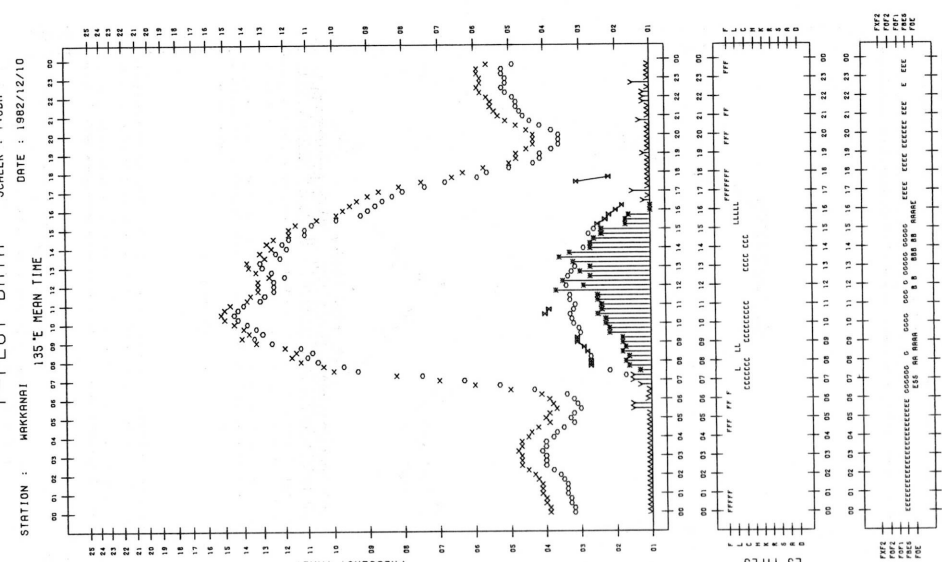
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S.HIDOME  
DATE : 1982/12/10



F-PLOT DATA  
STATION : AKITA  
SCALER : T.MORI  
DATE : 1982/12/10

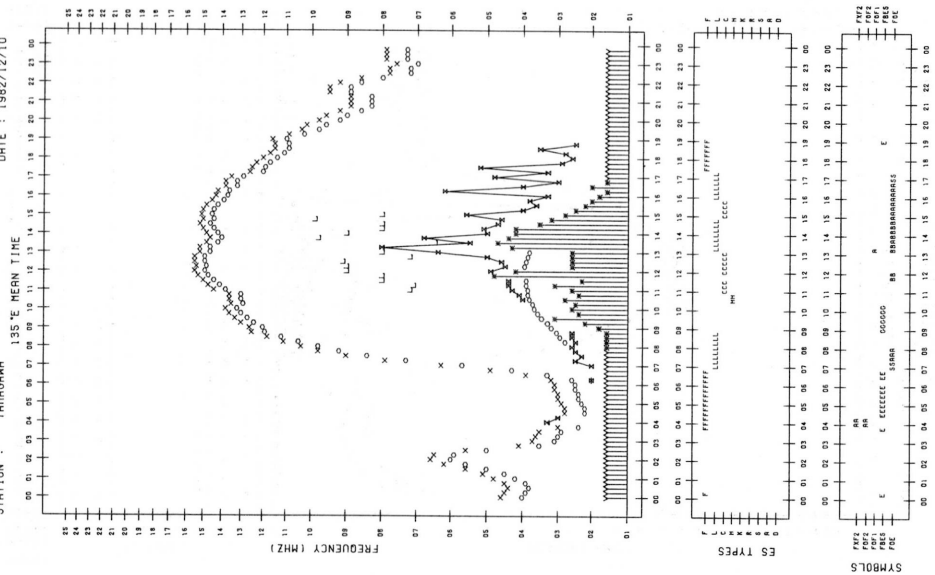


F-PLOT DATA  
STATION : WAKKANAI  
SCALER : T.ODA  
DATE : 1982/12/10



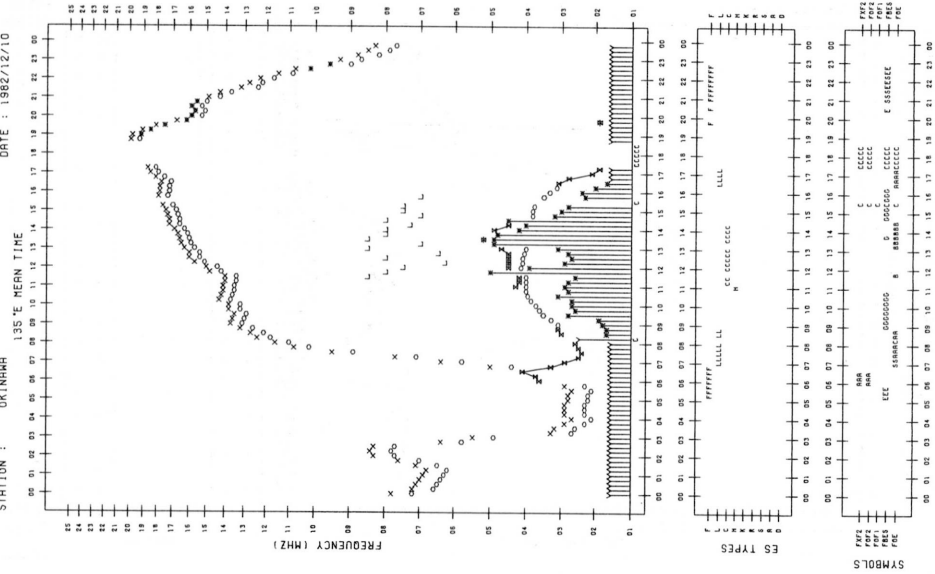
F-PLOT DATA

STATION : YABORAMA SCALER : I. NISHIMUTA  
 DATE : 1982/12/10



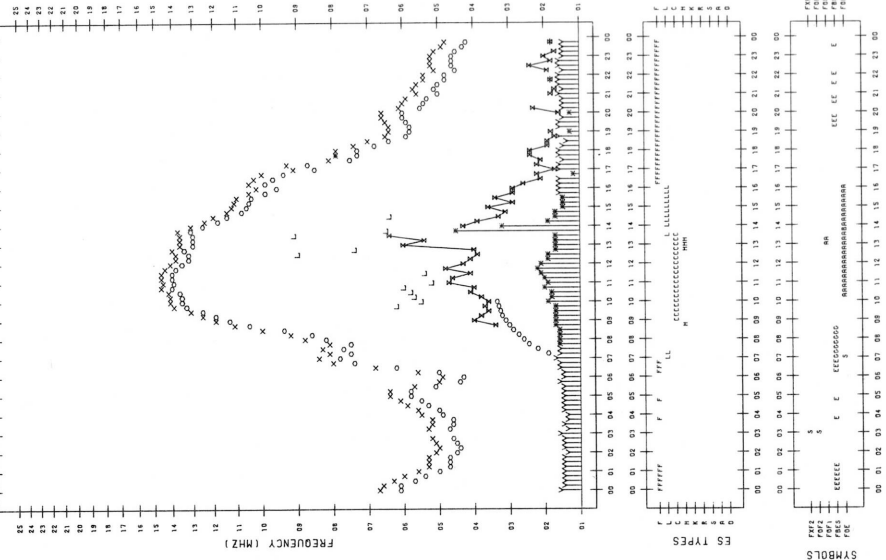
F-PLOT DATA

STATION : OKINAWA SCALER : K. MURAKAWASHI  
 DATE : 1982/12/10

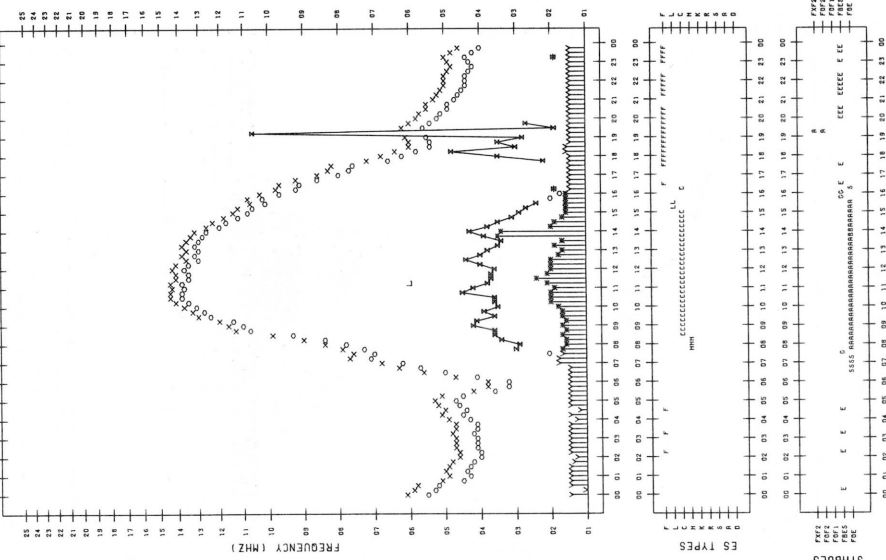




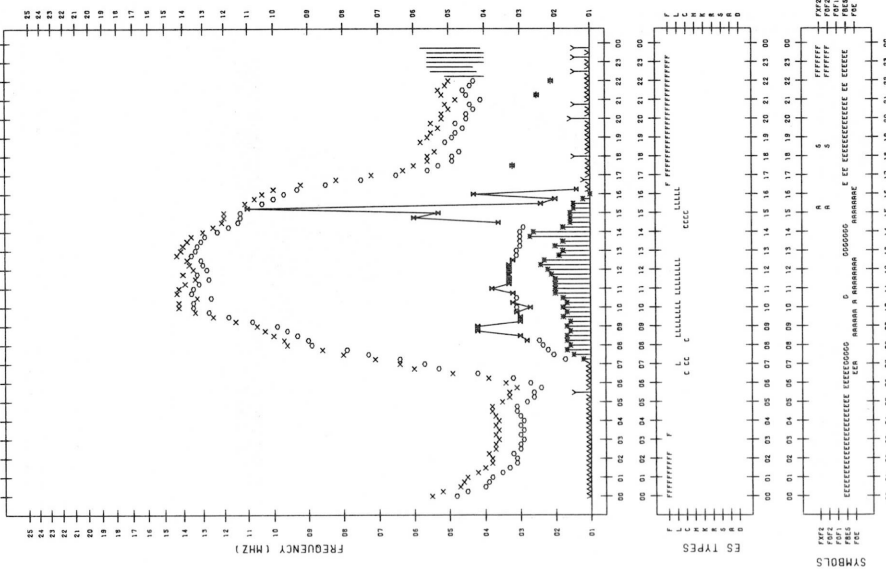
F- PLOT DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIDOME  
 DATE : 1982/12/11  
 135°E MEAN TIME



F- PLOT DATA  
 STATION : AKITA  
 SCALER : Y-ECHIZENYA  
 DATE : 1982/12/11  
 135°E MEAN TIME



F- PLOT DATA  
 STATION : MARUKANI  
 SCALER : T-ODR  
 DATE : 1982/12/11  
 135°E MEAN TIME

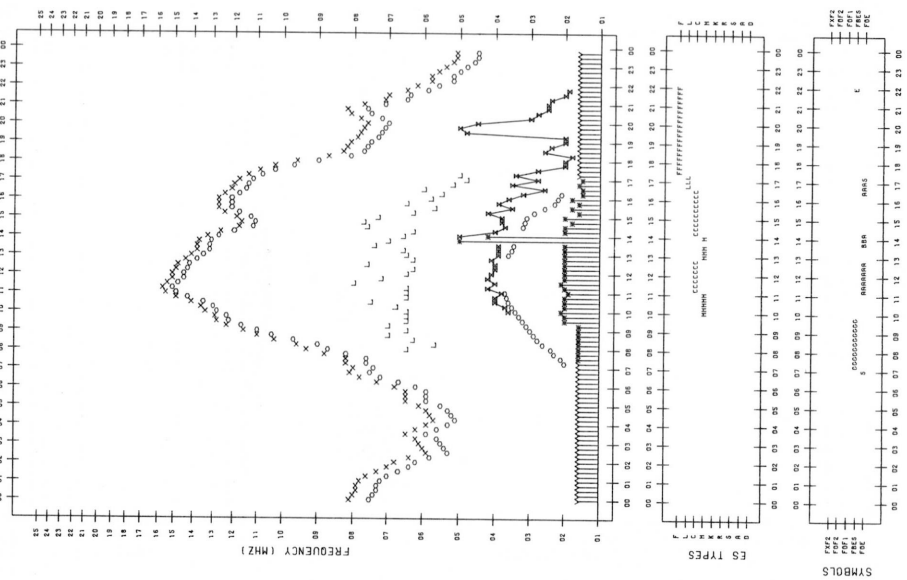


F-PLOT DATA

STATION : YAGOHARA SCALER : S-KAMISHIKIRYO

DATE : 1982/12/11

135°E MEAN TIME

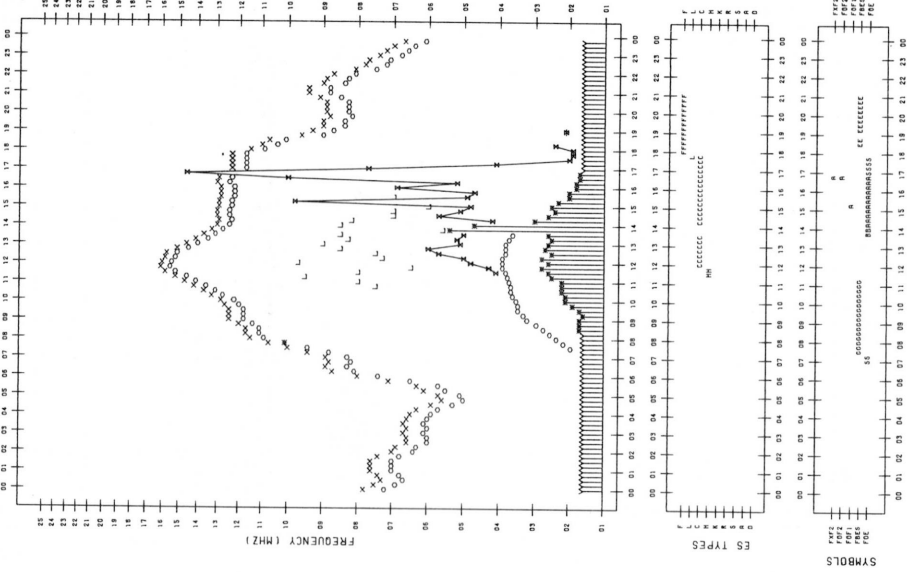


F-PLOT DATA

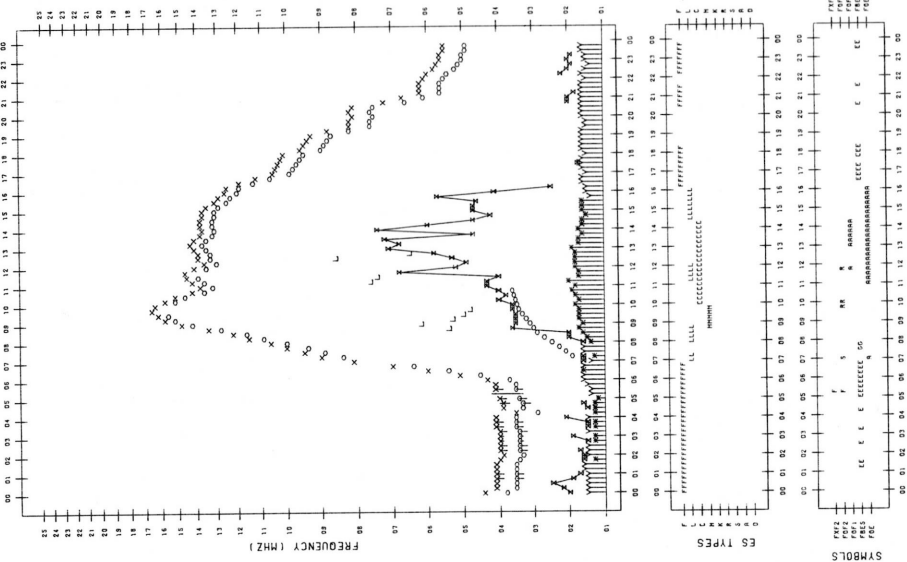
STATION : OKINAWA SCALER : K-KARABAYASHI

DATE : 1982/12/11

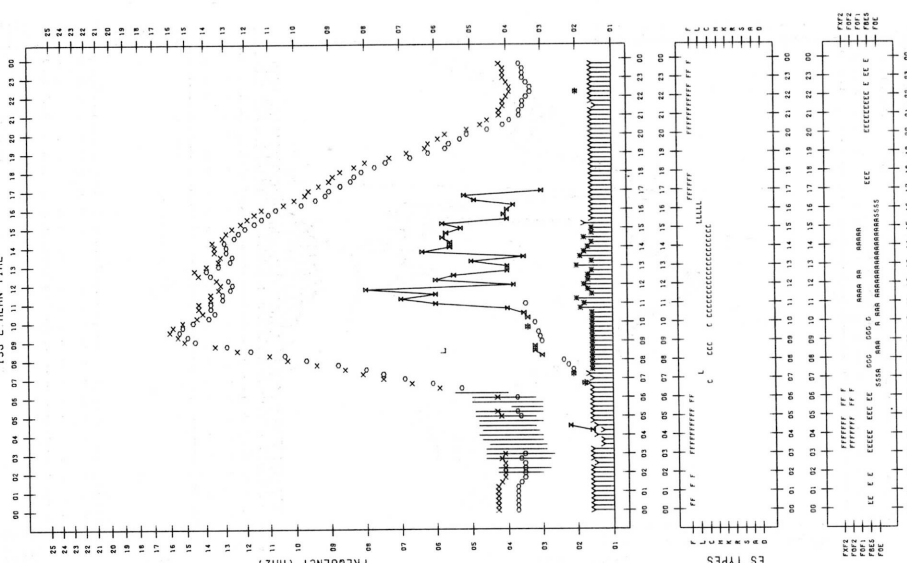
135°E MEAN TIME



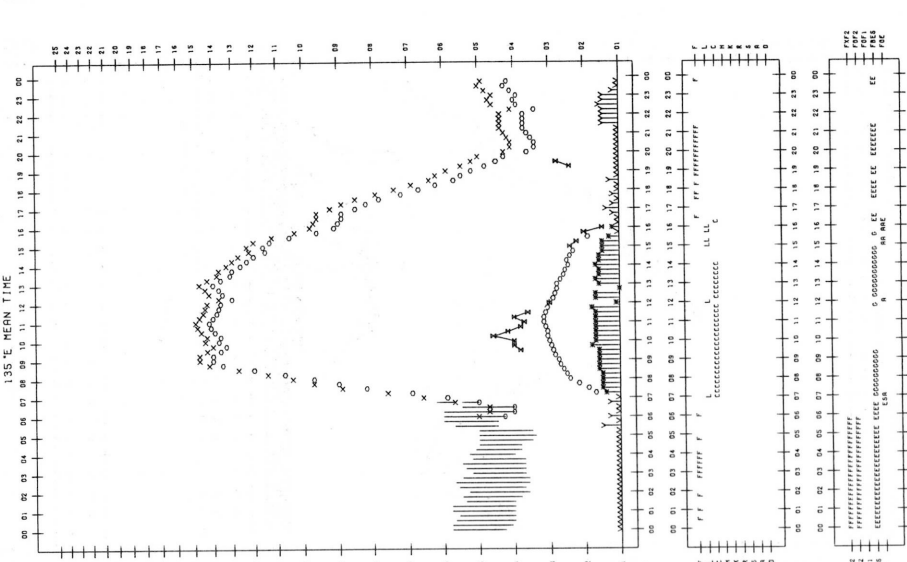
F-PLOT DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : 5-HIJDOME  
 DATE : 1982/12/12  
 135°E MEAN TIME



F-PLOT DATA  
 STATION : AKITA  
 SCALER : T-MORI  
 DATE : 1982/12/12  
 135°E MEAN TIME

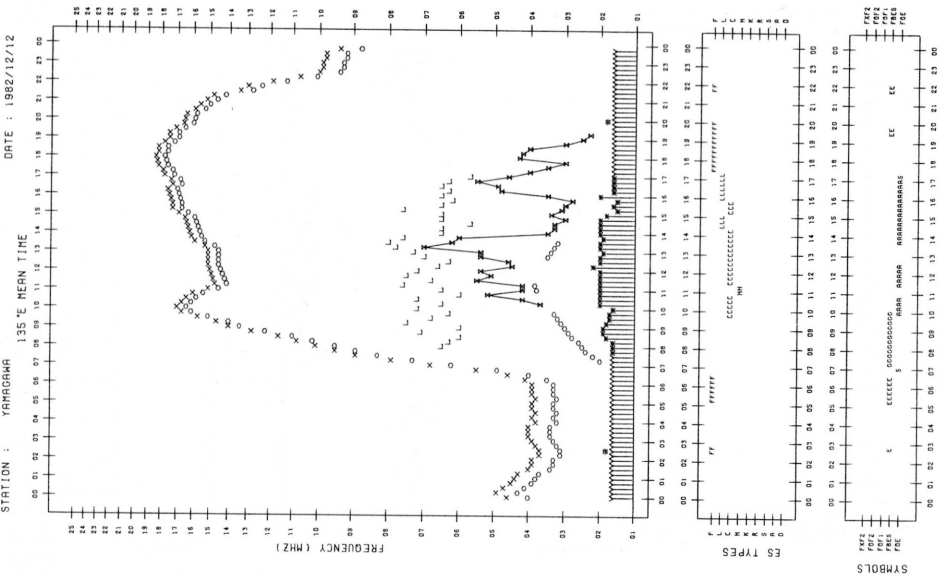


F-PLOT DATA  
 STATION : WAKKANAI  
 SCALER : T-ODR  
 DATE : 1982/12/12  
 135°E MEAN TIME



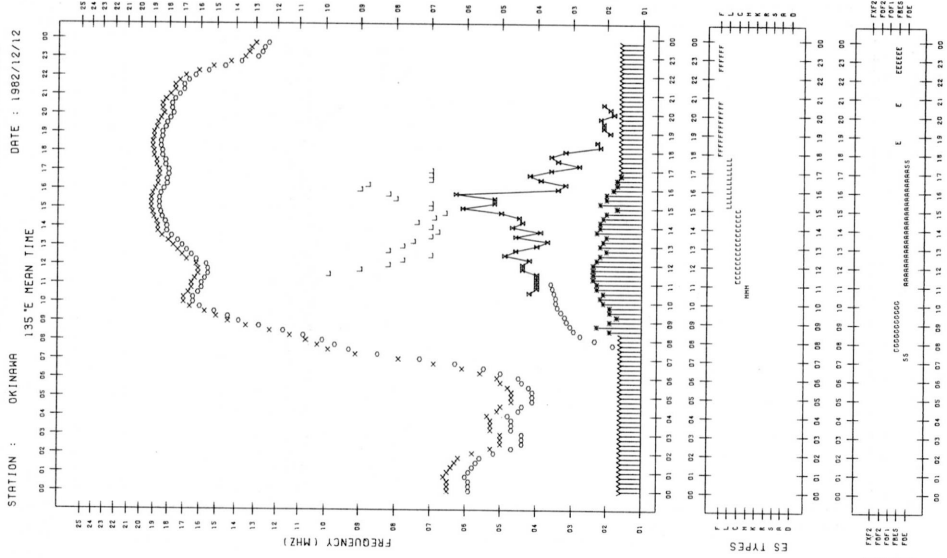
F-PLOT DATA

STATION : YAKOHAMA SCALER : S-KMISHIKIRYO DATE : 1982/12/12



F-PLOT DATA

STATION : OKINAWA SCALER : R-OTSUKA DATE : 1982/12/12



STATION : KOKUBUNJI TOKYO  
SCALER : S-HI100HE  
DATE : 1982/12/13  
135°E MEAN TIME

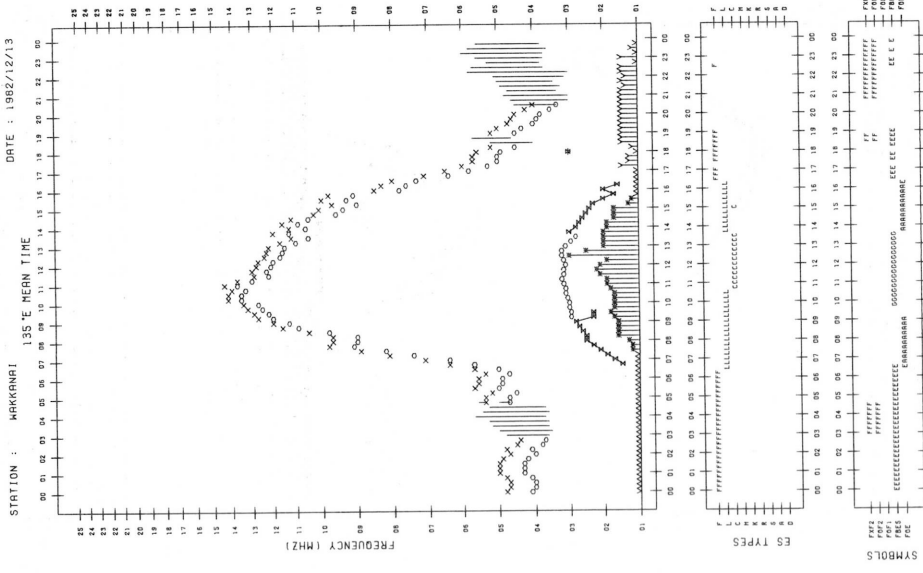
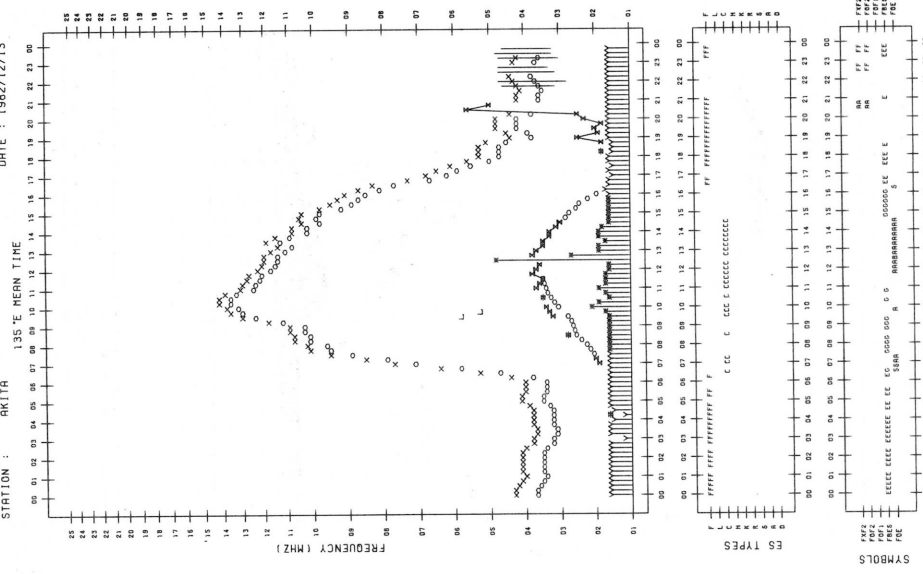
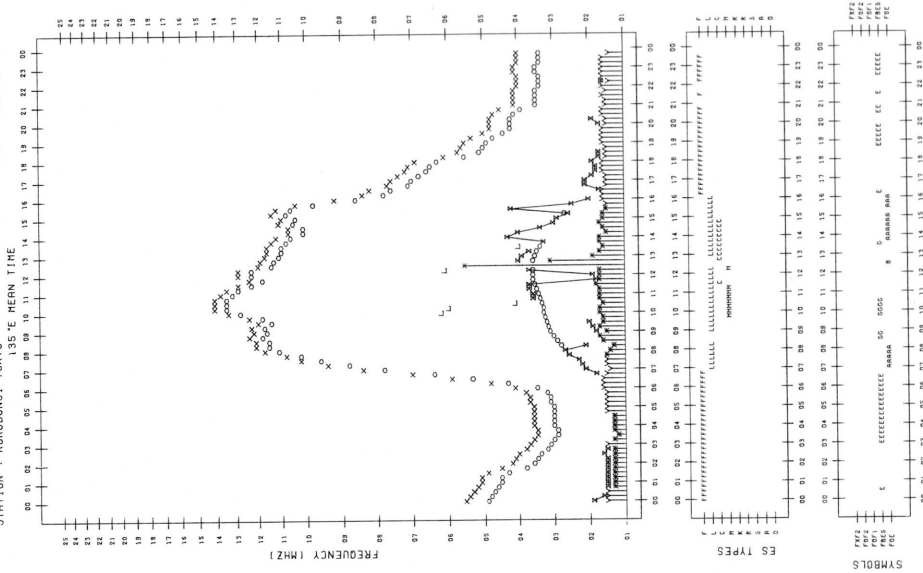
STATION : AKITA  
SCALER : T-MORI  
DATE : 1982/12/13  
135°E MEAN TIME

STATION : MARIKAWA  
SCALER : T-00A  
DATE : 1982/12/13  
135°E MEAN TIME

F- PLOT DATA

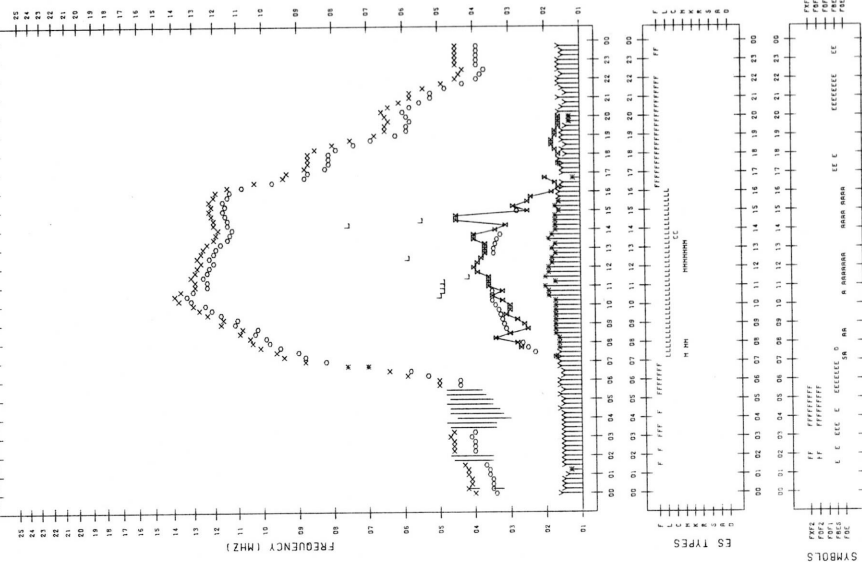
F- PLOT DATA

F- PLOT DATA

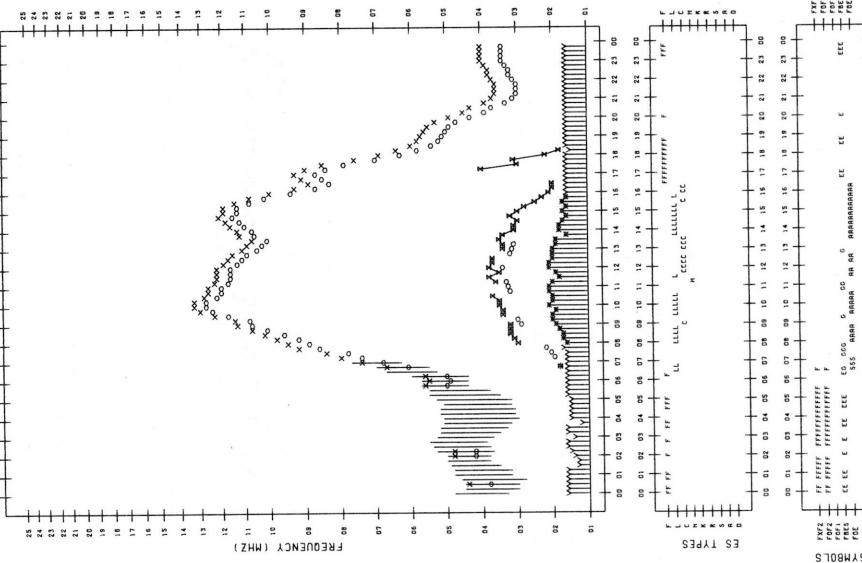




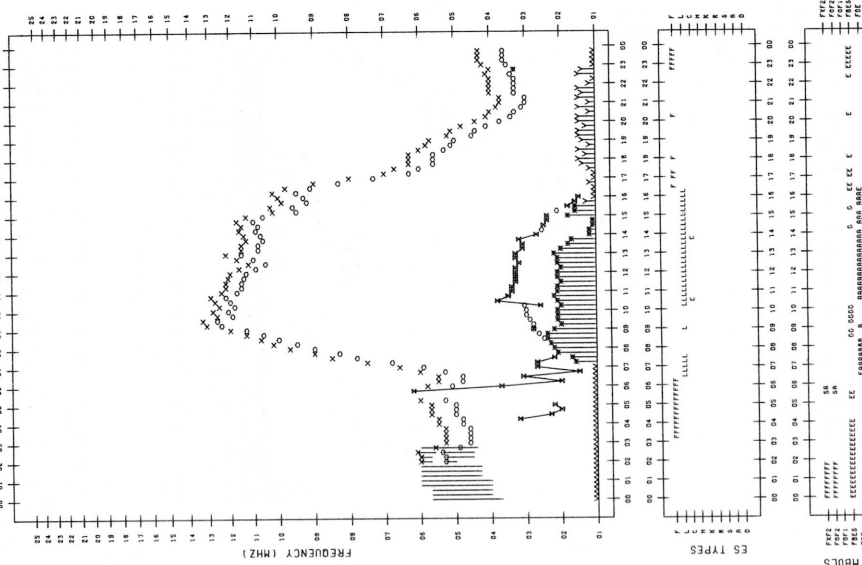
F-PLOT DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIDONE  
 DATE : 1982/12/14  
 135°E MEAN TIME



F-PLOT DATA  
 STATION : AKITA  
 SCALER : T-MORI  
 DATE : 1982/12/14  
 135°E MEAN TIME



F-PLOT DATA  
 STATION : HAKKAI  
 SCALER : T-ODR  
 DATE : 1982/12/14  
 135°E MEAN TIME



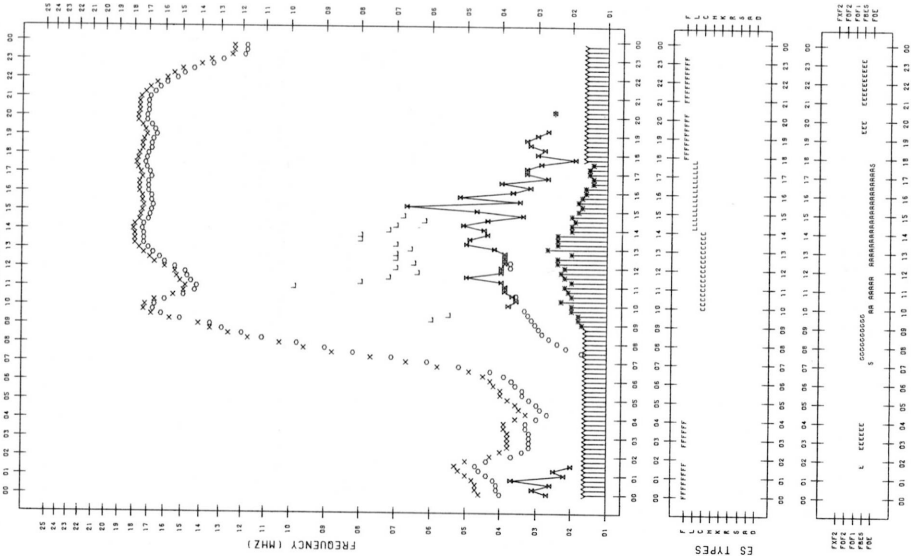
F-PLOT DATA

STATION : YAMAGAWA

SCALER : S-KHISHIKIRYO

DATE : 1982/12/14

135°E MEAN TIME



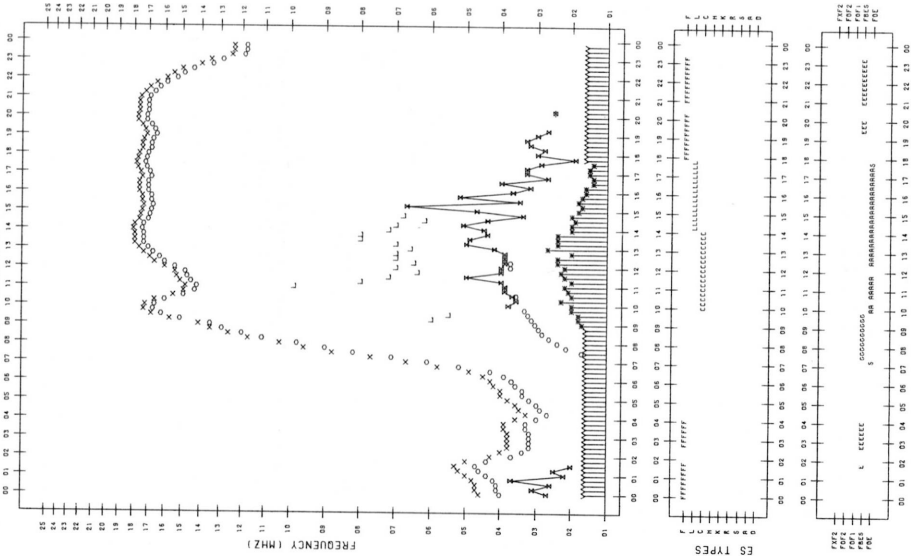
F-PLOT DATA

STATION : OKINAWA

SCALER : R-DTSUKA

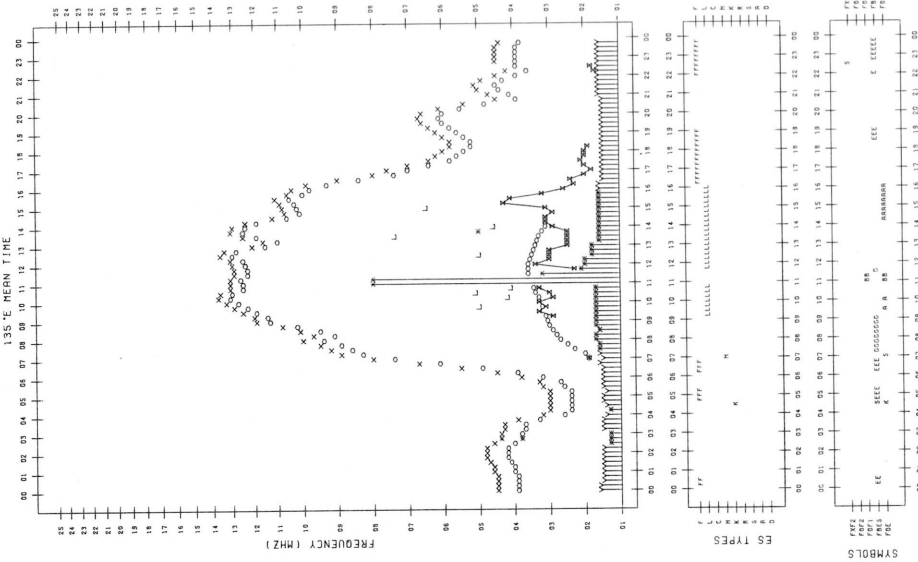
DATE : 1982/12/14

135°E MEAN TIME

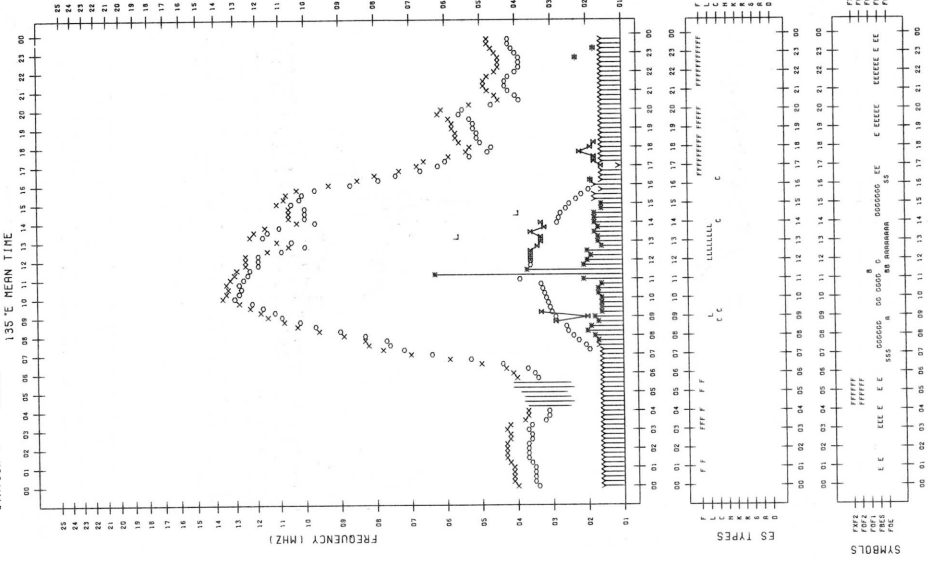




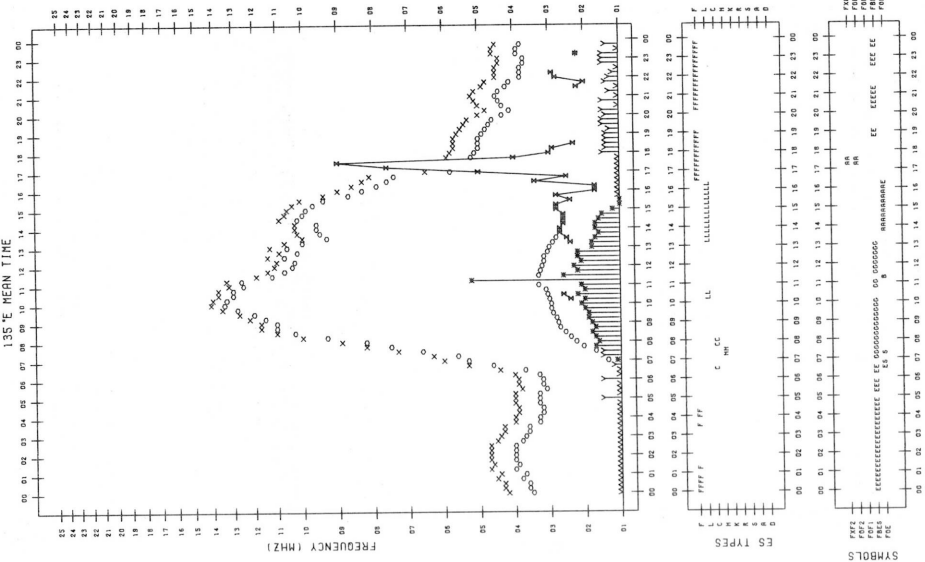
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HIDOME  
DATE : 1982/12/15  
135°E MEAN TIME

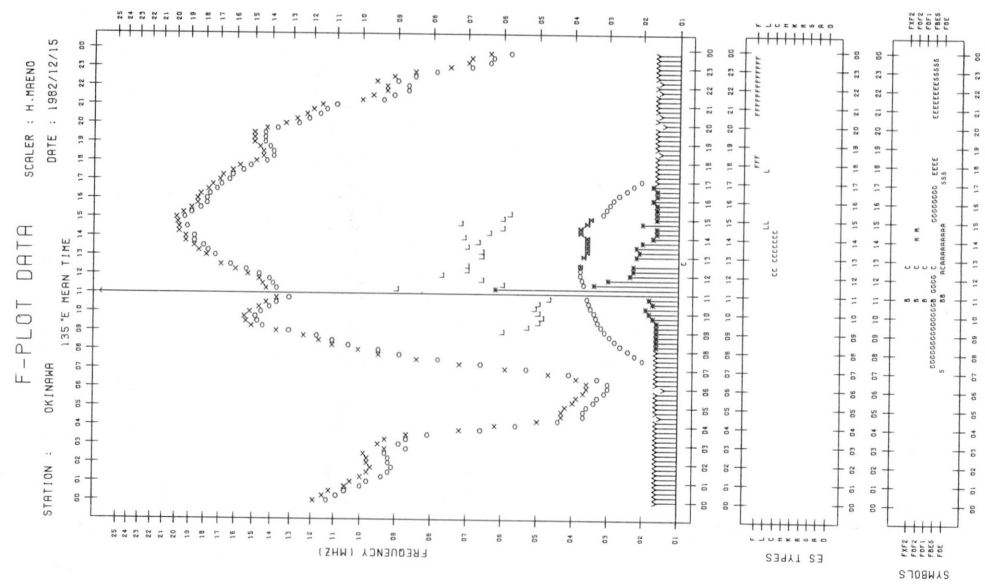
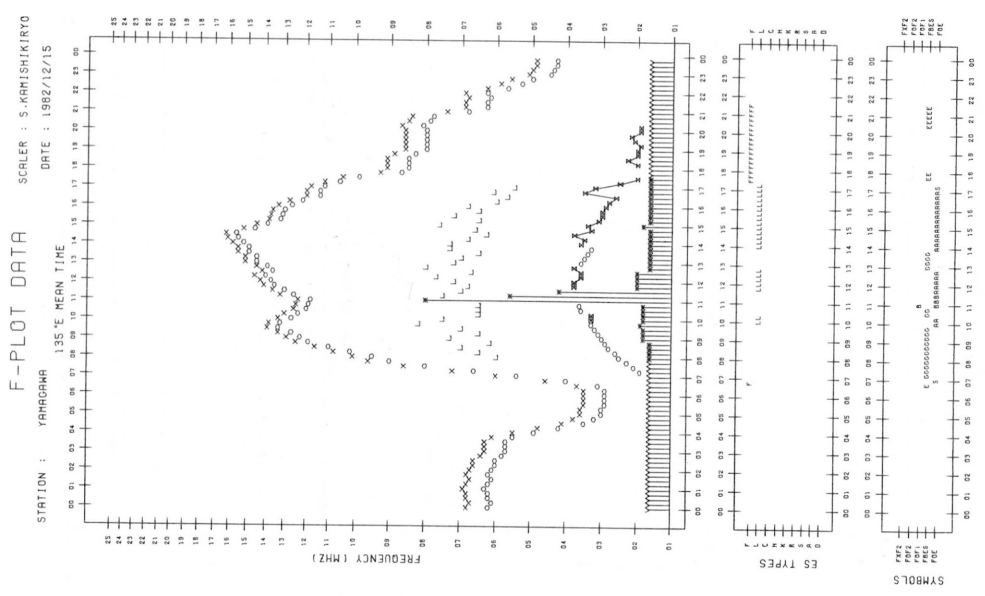


F-PLOT DATA  
STATION : AKITA  
SCALER : T-MORI  
DATE : 1982/12/15  
135°E MEAN TIME

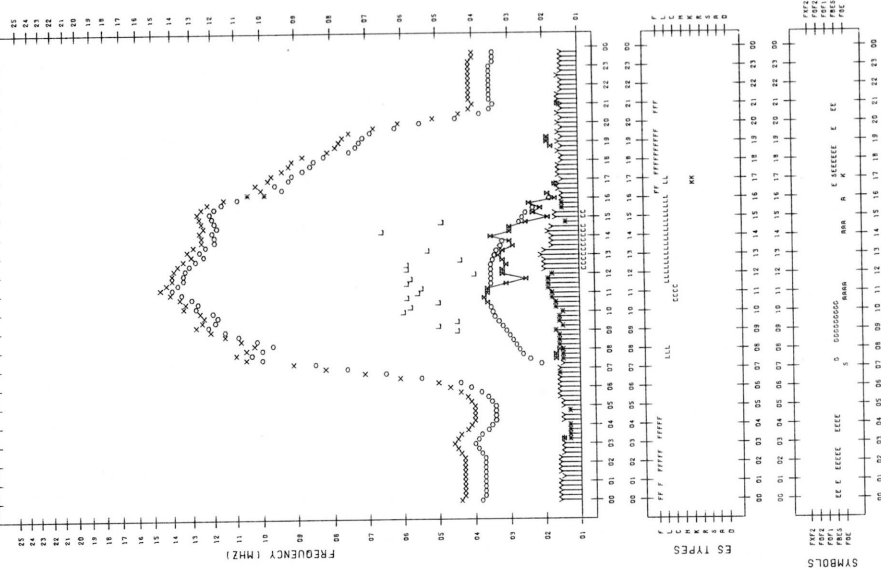


F-PLOT DATA  
STATION : HAKKAI  
SCALER : T-ODA  
DATE : 1982/12/15  
135°E MEAN TIME

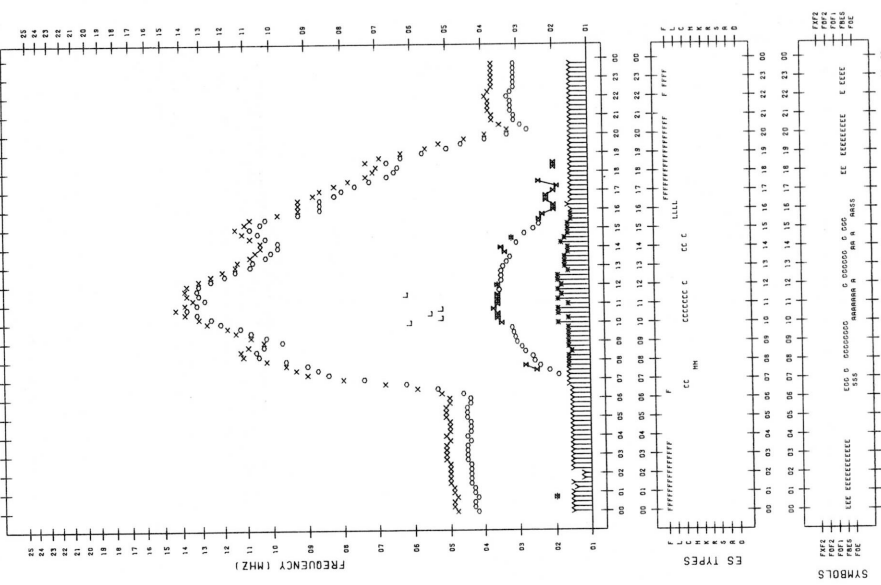




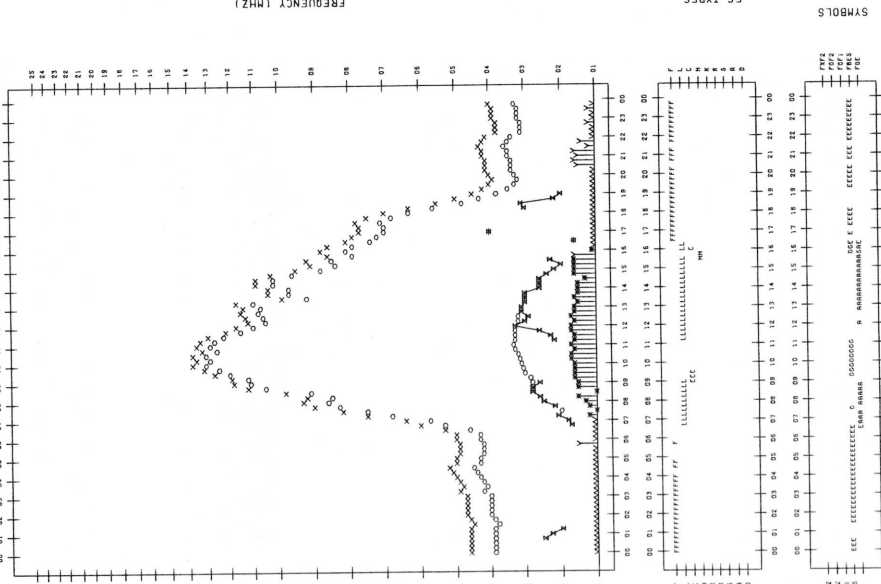
F- PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HIDOME  
DATE : 1982/12/16  
135°E MEAN TIME



F- PLOT DATA  
STATION : AKITA  
SCALER : Y-ECHIZENYA  
DATE : 1982/12/16  
135°E MEAN TIME

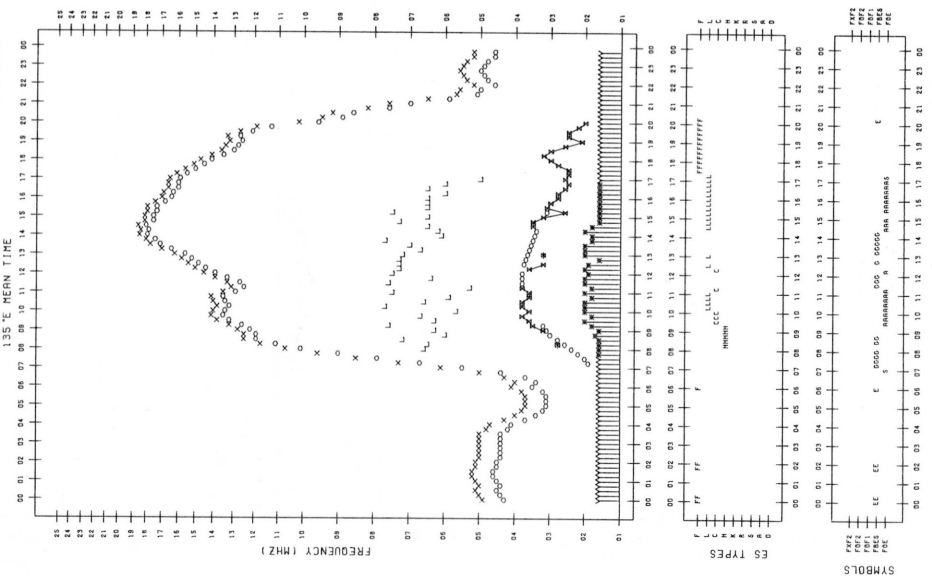


F- PLOT DATA  
STATION : WAKKANAI  
SCALER : T-ODR  
DATE : 1982/12/16  
135°E MEAN TIME



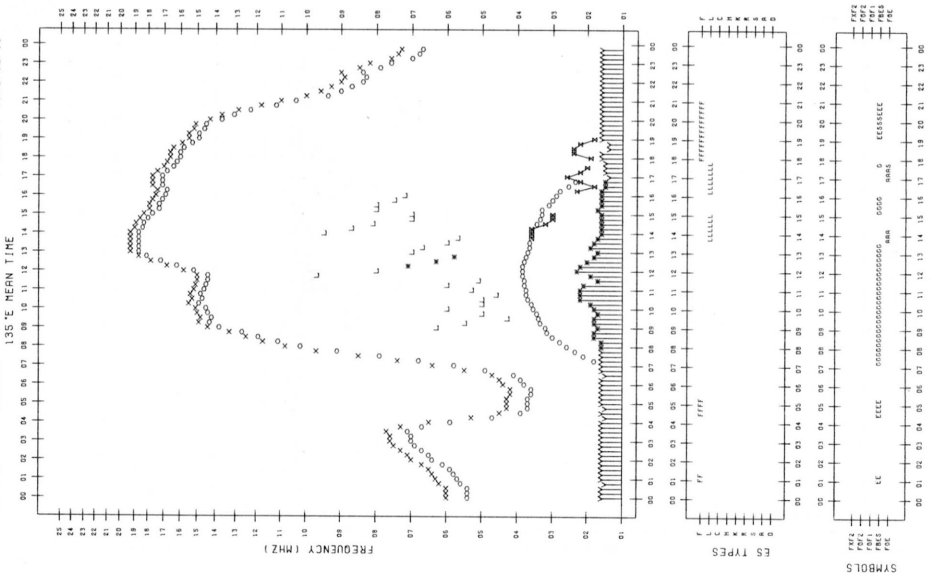
F-plot DATA

STATION : YAHAGAMA SCALER : S-KAMISHIKIRYO DATE : 1982/12/16



F-plot DATA

STATION : OKINAWA SCALER : H-MRENO DATE : 1982/12/16



STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIJDOME  
 DATE : 1982/12/17

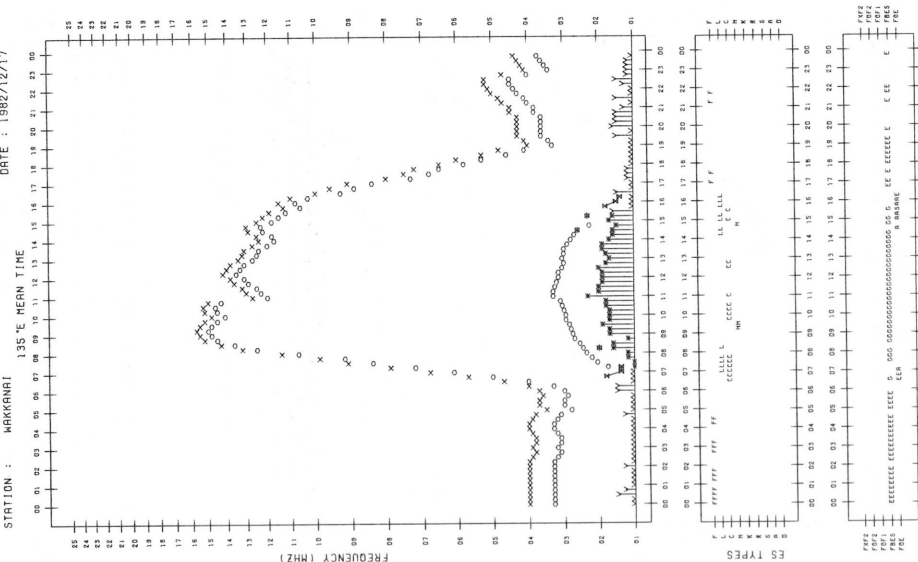
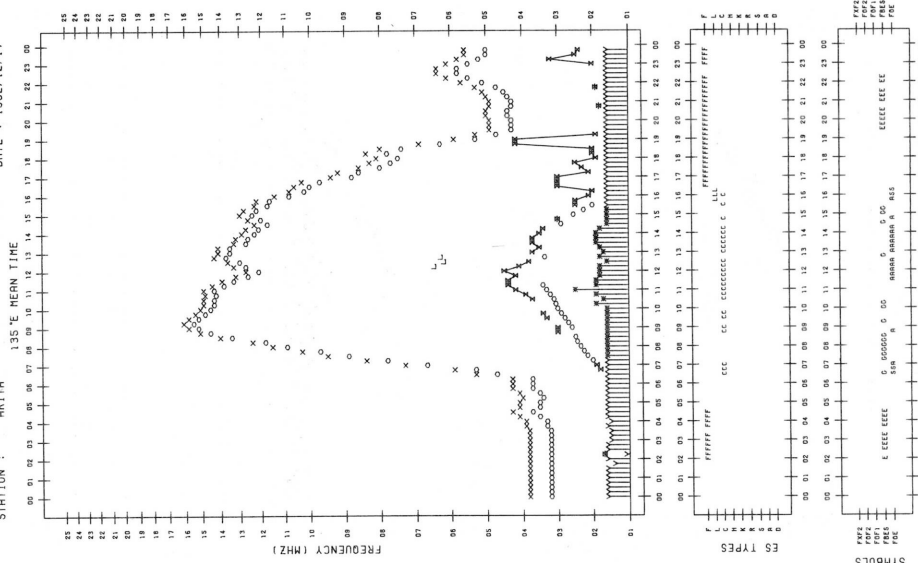
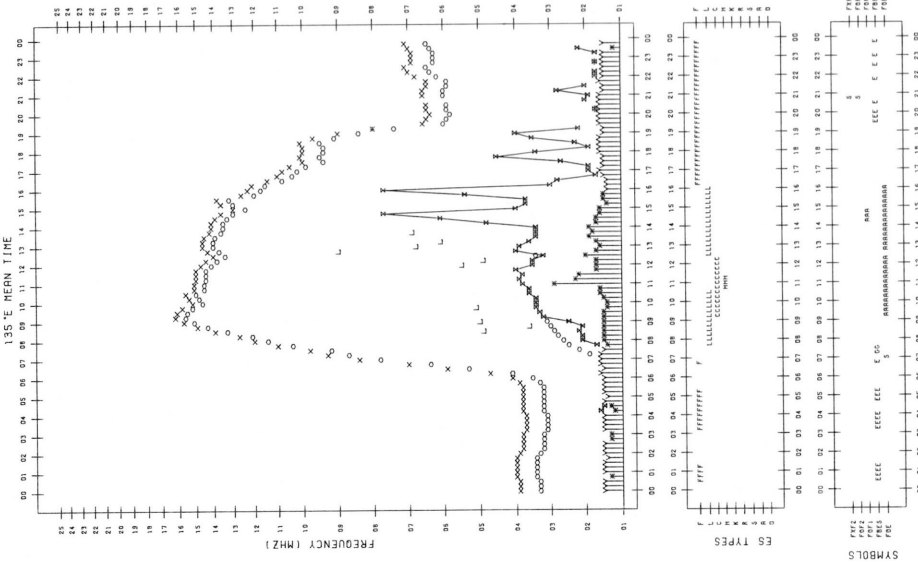
STATION : AKITA  
 SCALER : T-HORI  
 DATE : 1982/12/17

STATION : MARUKANI  
 SCALER : T-ODA  
 DATE : 1982/12/17

F-PLOT DATA

F-PLOT DATA

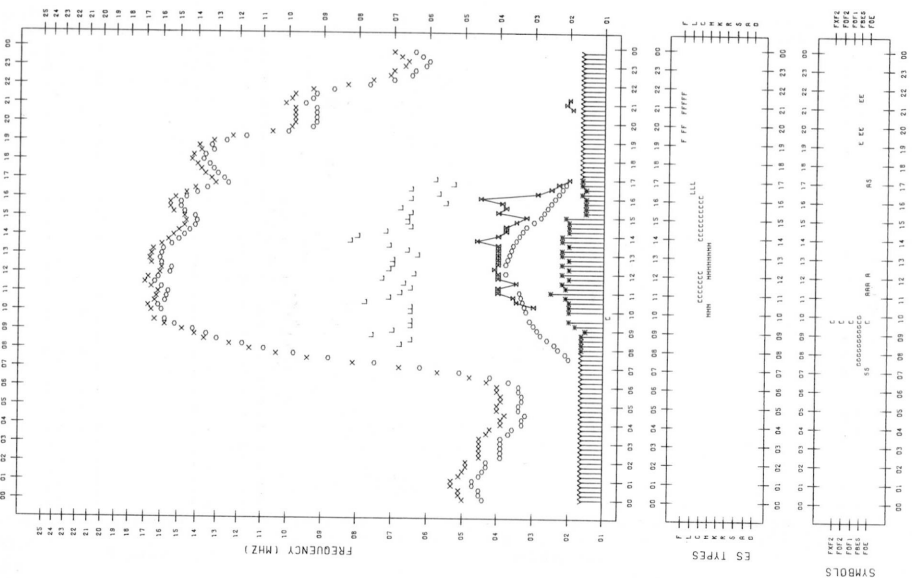
F-PLOT DATA



F-plot DATA

STATION : YABARAWA SCALER : S-KAMISHIKIRYO DATE : 1982/12/17

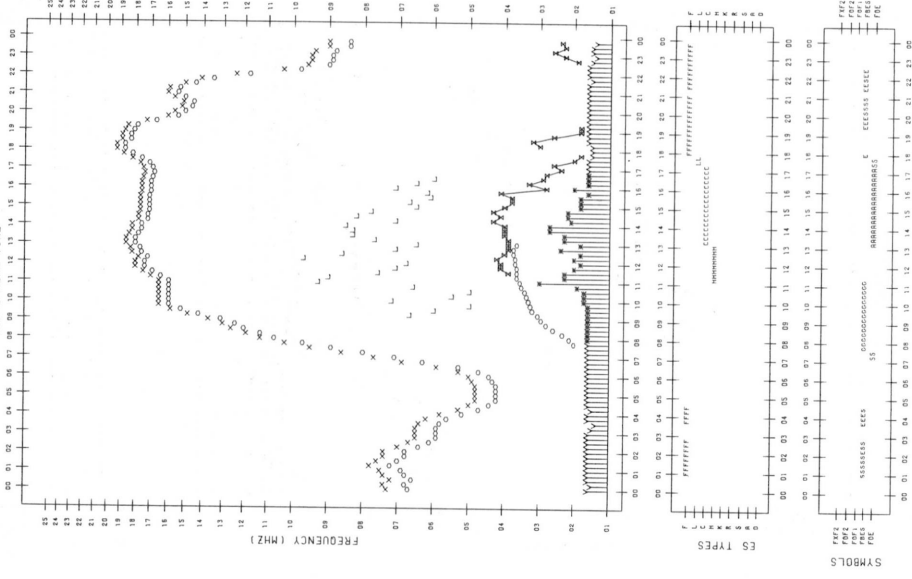
135°E MEAN TIME



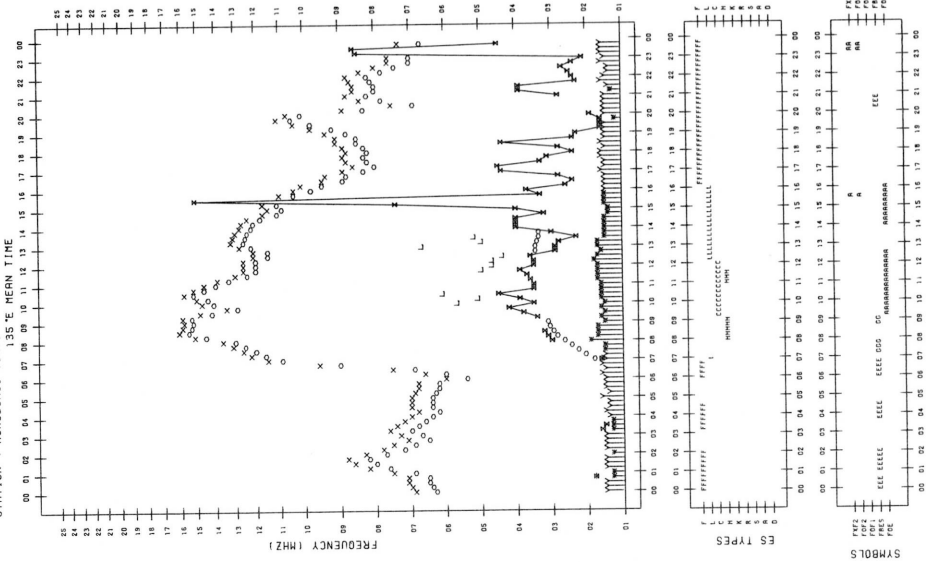
F-plot DATA

STATION : OKINAWA SCALER : H-ARENO DATE : 1982/12/17

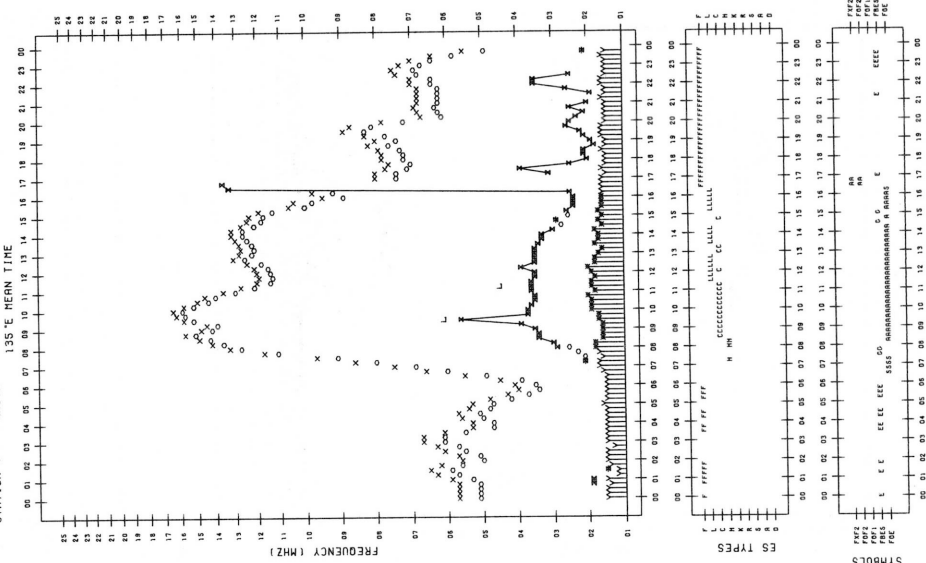
135°E MEAN TIME



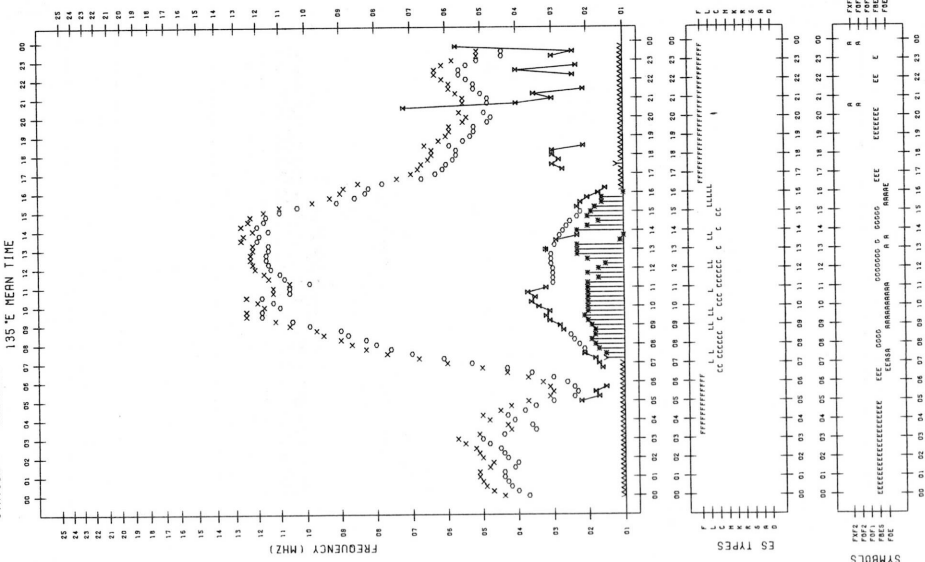
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HIUDOME  
DATE : 1982/12/18  
135°E MEAN TIME

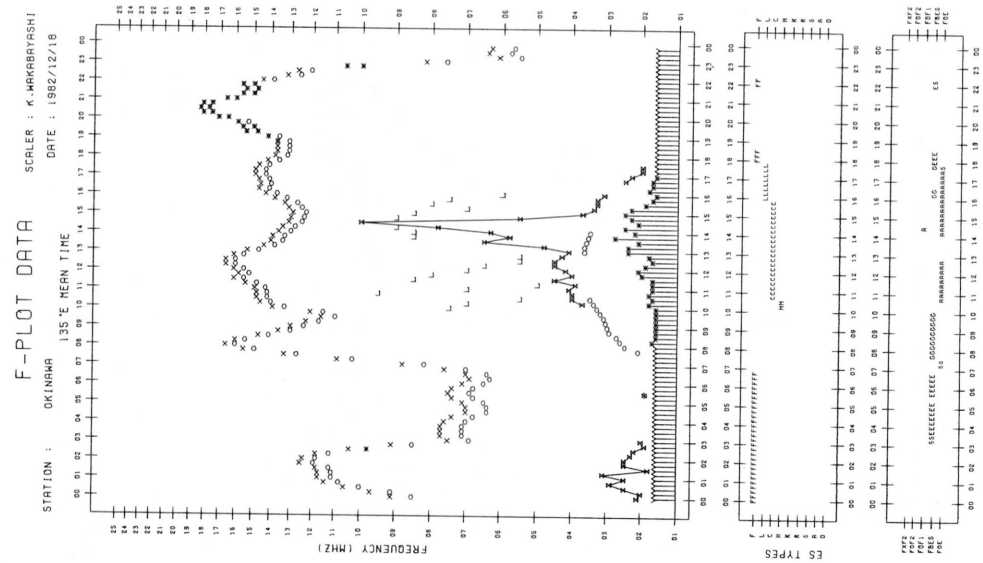
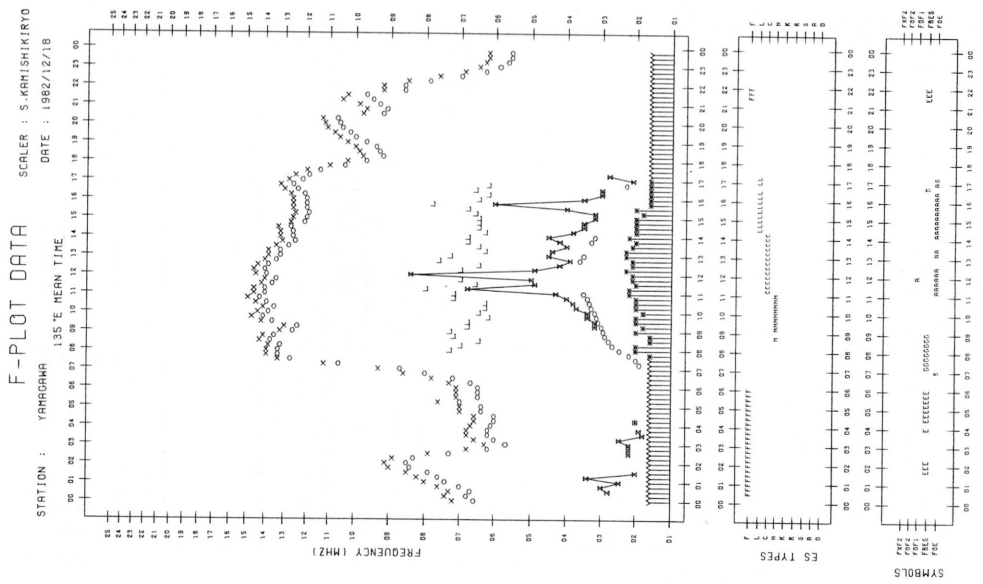


F-PLOT DATA  
STATION : AKITA  
SCALER : Y-ECHIZENYA  
DATE : 1982/12/18  
135°E MEAN TIME



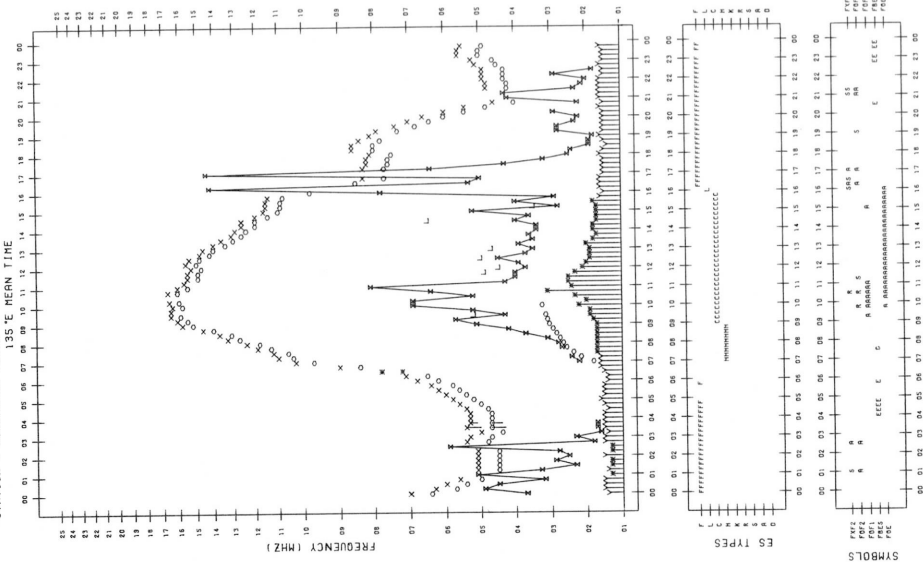
F-PLOT DATA  
STATION : WAKKANRAI  
SCALER : T-ODR  
DATE : 1982/12/18  
135°E MEAN TIME



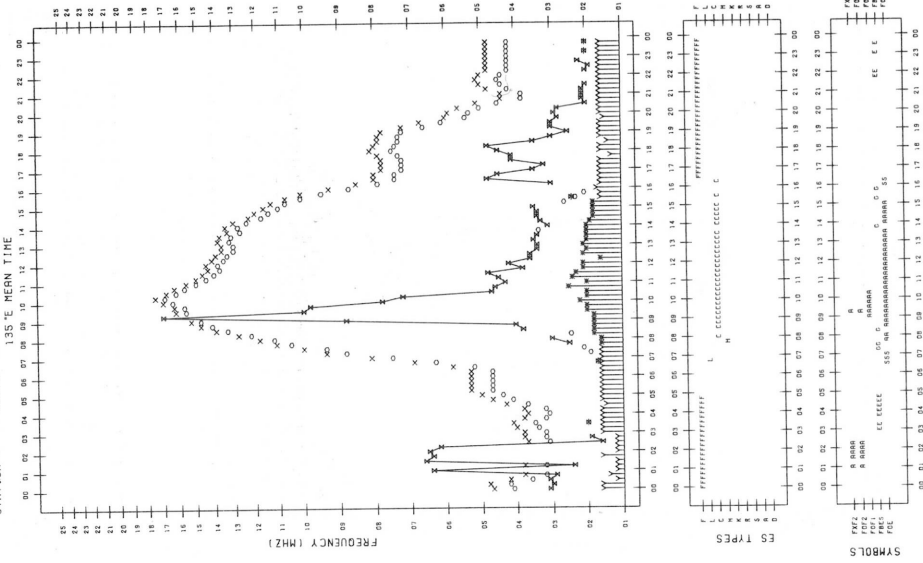




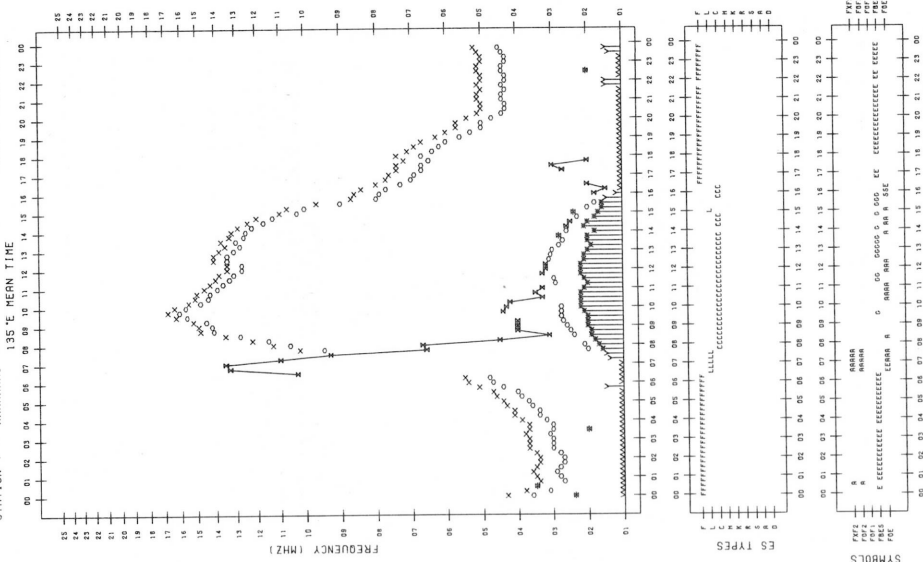
F-PLOT DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIDOME  
 DATE : 1982/12/19  
 135°E MEAN TIME



F-PLOT DATA  
 STATION : AKITA  
 SCALER : T-HORI  
 DATE : 1982/12/19  
 135°E MEAN TIME

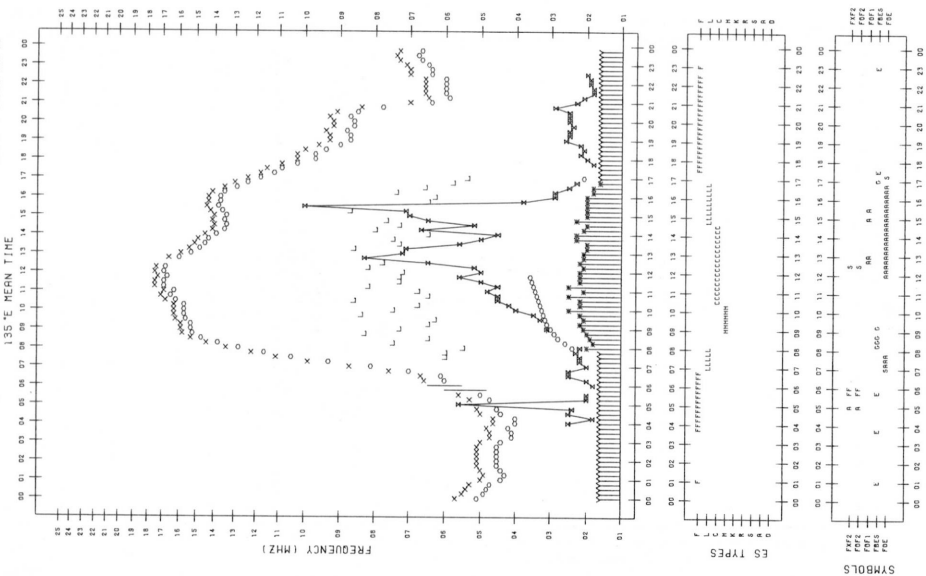


F-PLOT DATA  
 STATION : MAKINAMI  
 SCALER : T-ODR  
 DATE : 1982/12/19  
 135°E MEAN TIME



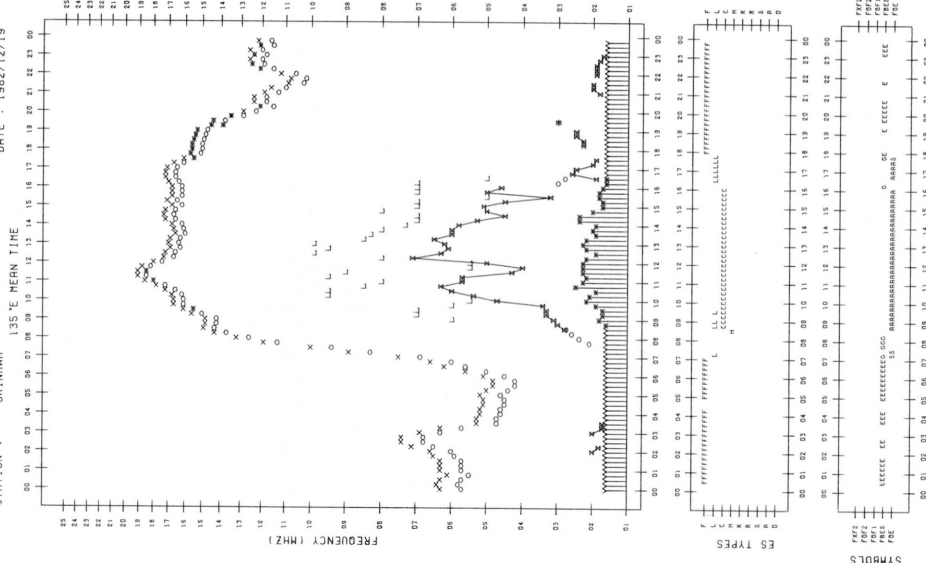
F-PLOT DATA

STATION : YAMAGAWA SCALER : S-KRMTSHIKIRYO DATE : 1982/12/19

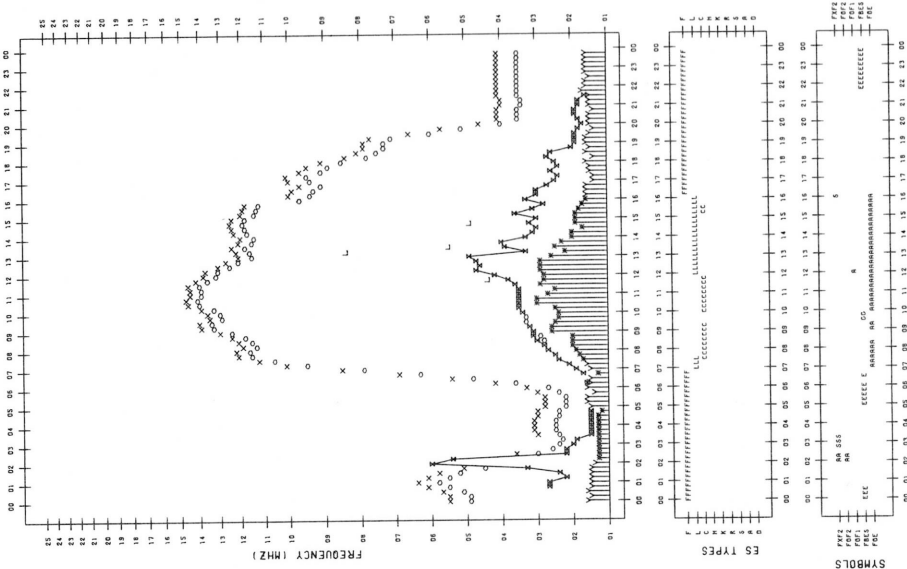


F-PLOT DATA

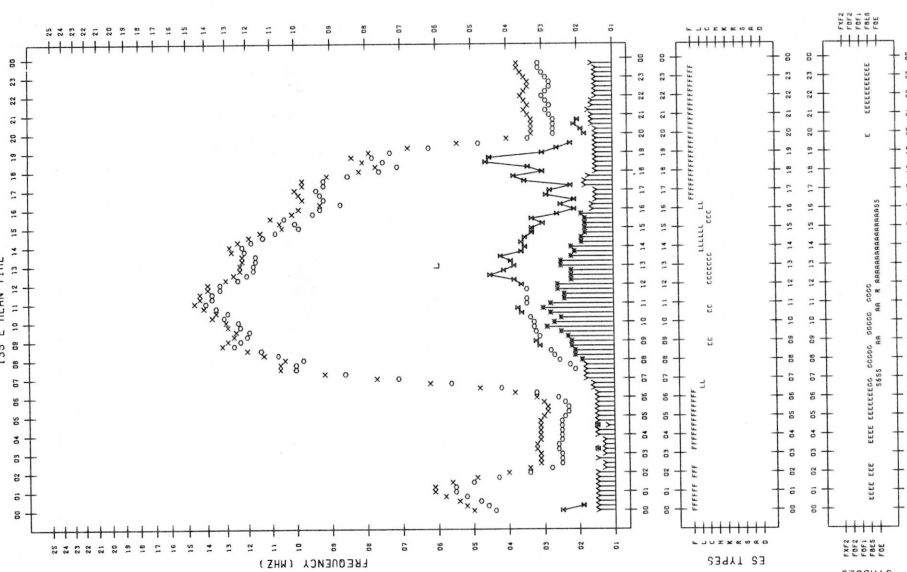
STATION : OKINAWA SCALER : K-IKARIBAYASHI DATE : 1982/12/19



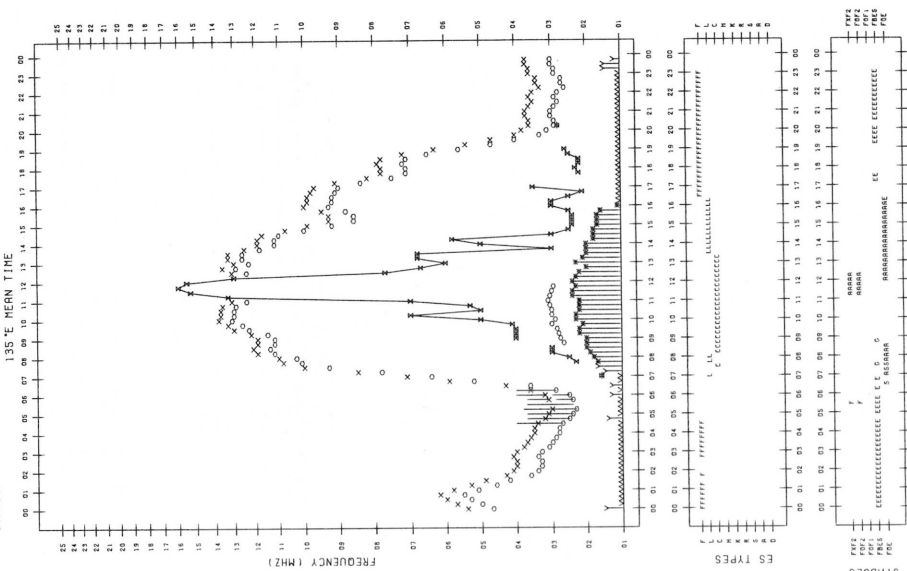
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HIDOME  
DATE : 1982/12/20  
135°E MEAN TIME



F-PLOT DATA  
STATION : AKITA  
SCALER : Y-ECHIZENYA  
DATE : 1982/12/20  
135°E MEAN TIME

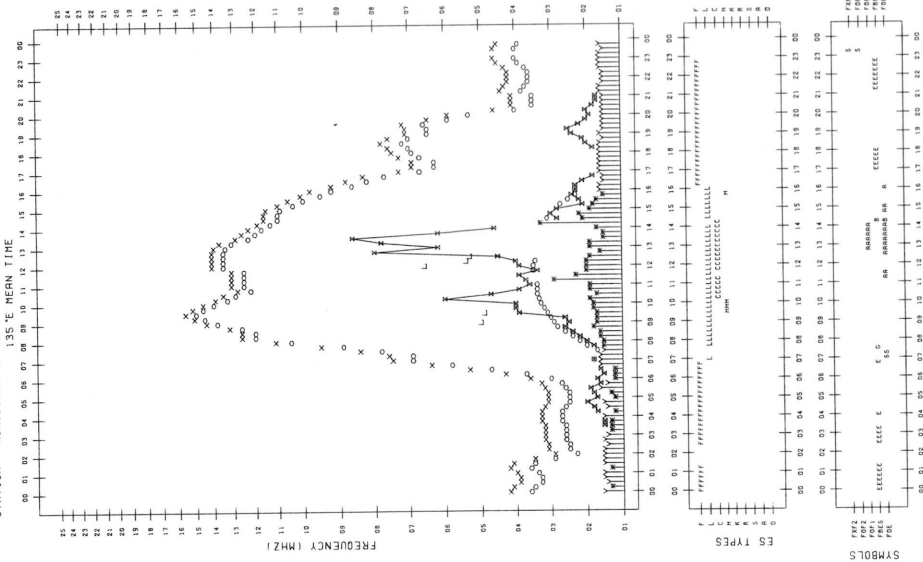


F-PLOT DATA  
STATION : MAKINAMI  
SCALER : T-ODA  
DATE : 1982/12/20  
135°E MEAN TIME

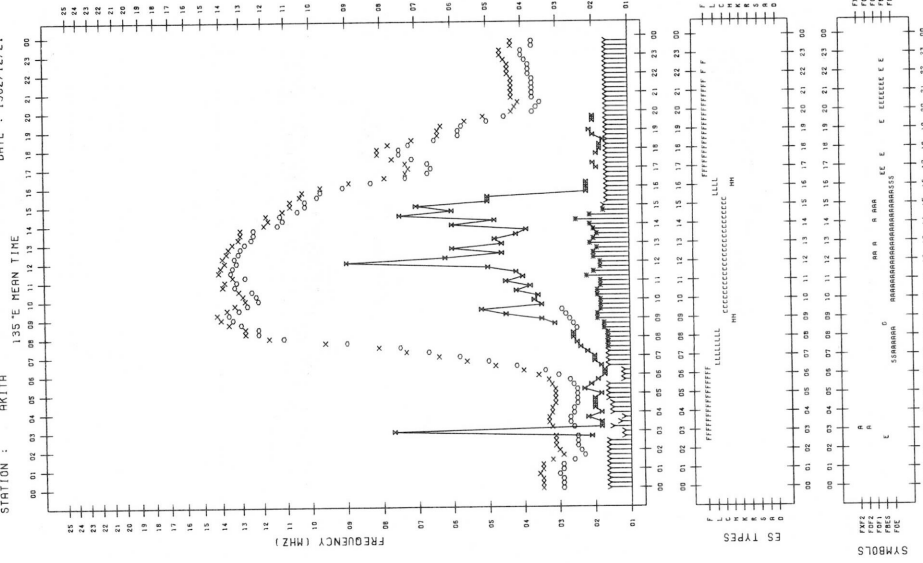




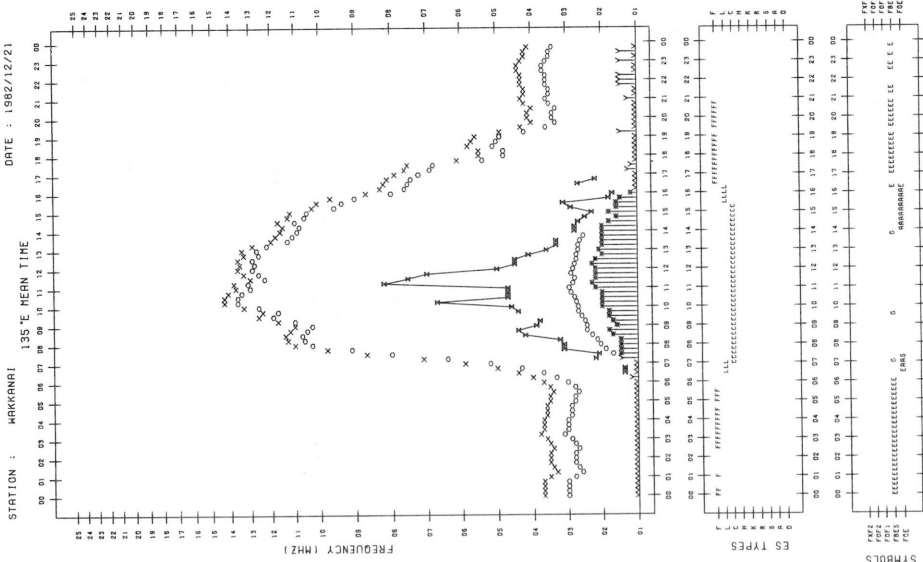
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HITODOME  
DATE : 1982/12/21  
135°E MEAN TIME



F-PLOT DATA  
STATION : AKITA  
SCALER : T-MORI  
DATE : 1982/12/21  
135°E MEAN TIME



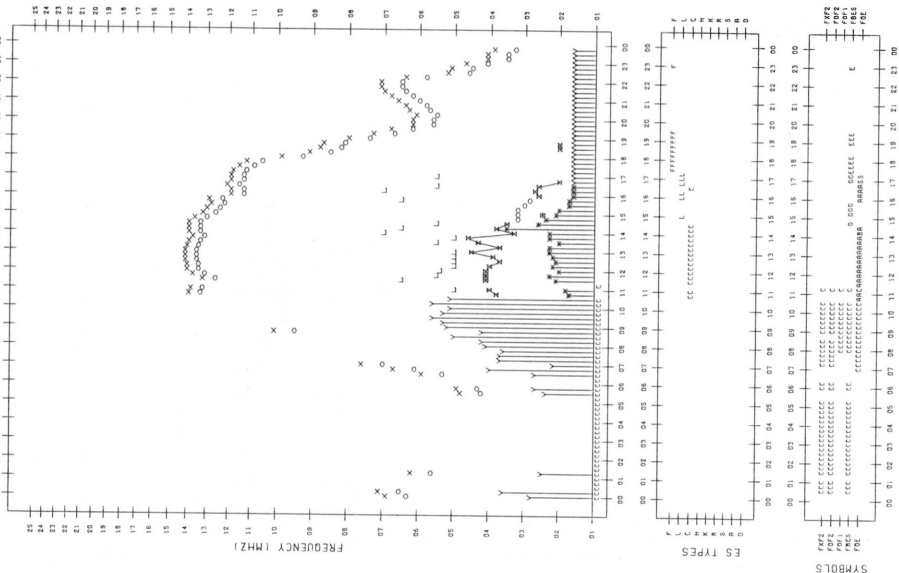
F-PLOT DATA  
STATION : HAKKAI  
SCALER : T-ODA  
DATE : 1982/12/21  
135°E MEAN TIME



F- PLOT DATA

STATION : YAMAGUCHI SCALER : H.MITSUJUNE DATE : 1982/12/21

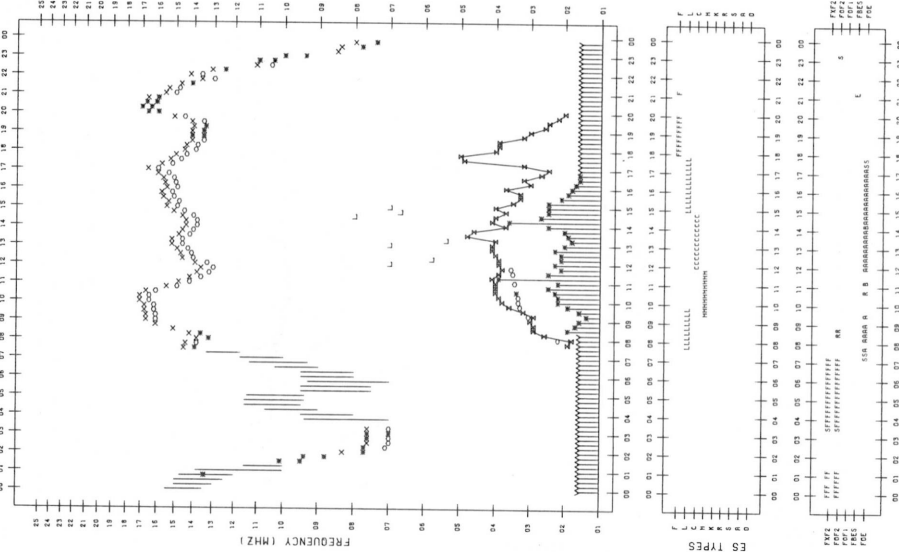
135°E MEAN TIME



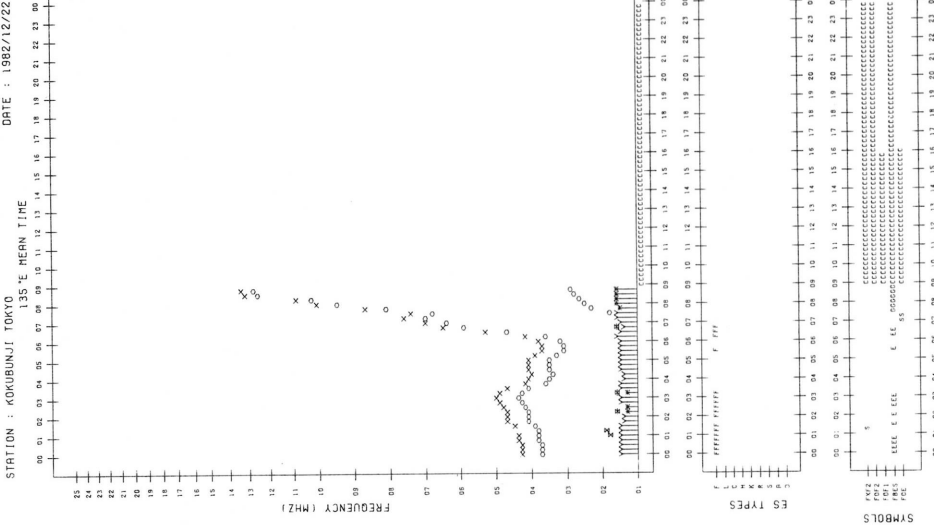
F- PLOT DATA

STATION : OKINAWA SCALER : R.OTSUKA DATE : 1982/12/21

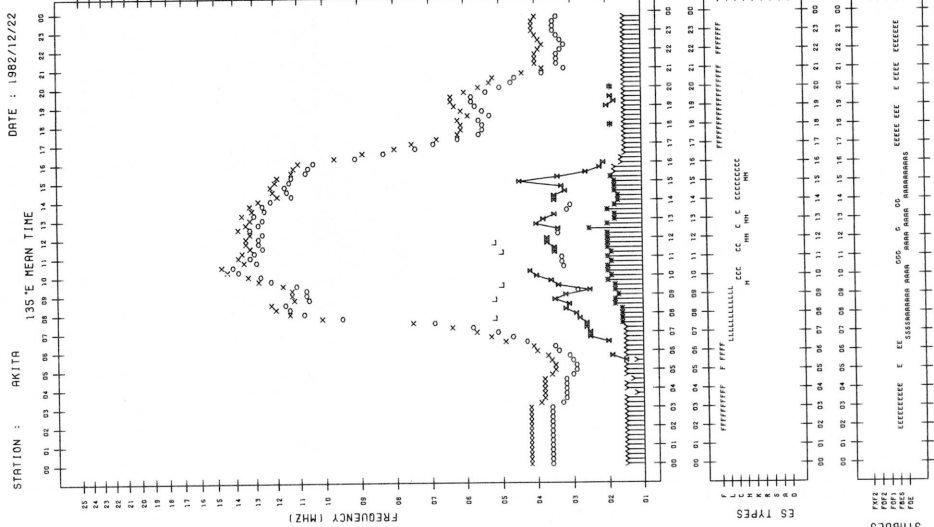
135°E MEAN TIME



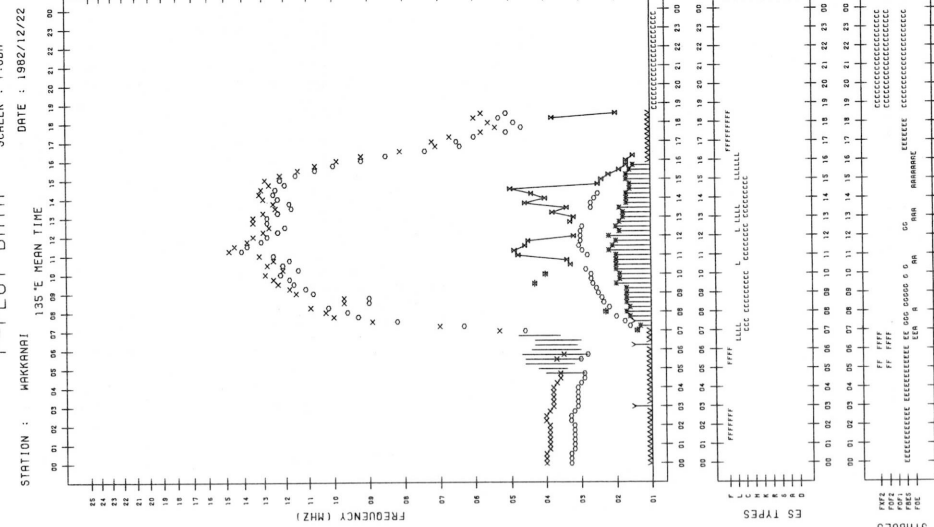
F- PLOT DATA  
STATION : #OKUBUNJI TOKYO  
SCALER : S-HIDOME  
DATE : 1982/12/22



F- PLOT DATA  
STATION : AKITA  
SCALER : Y.ECHIZENYA  
DATE : 1982/12/22



F- PLOT DATA  
STATION : WAKKANAI  
SCALER : T.ODA  
DATE : 1982/12/22





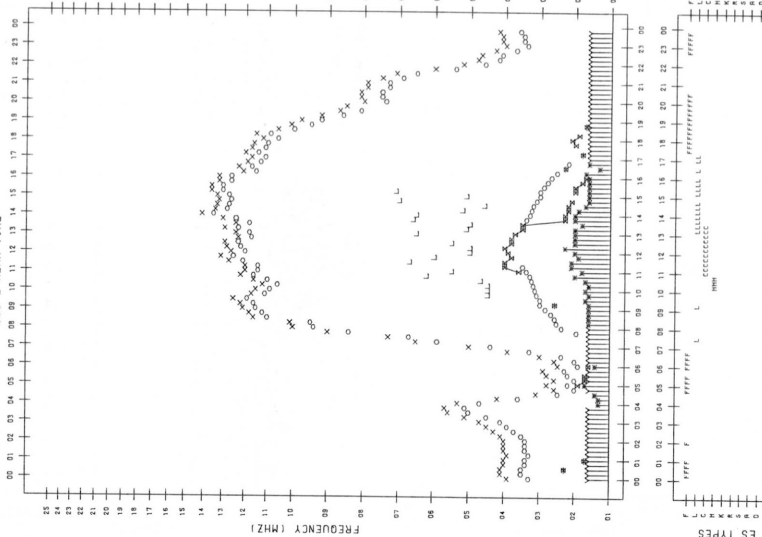




F-plot DATA

STATION : YABAGAWA SCALER : H. HITSUDOME DATE : 1982/12/23

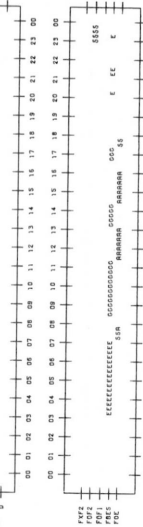
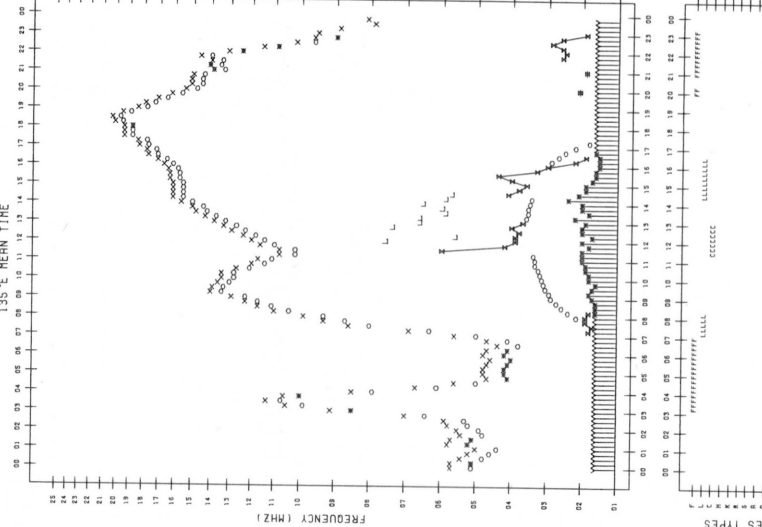
135°E MEAN TIME



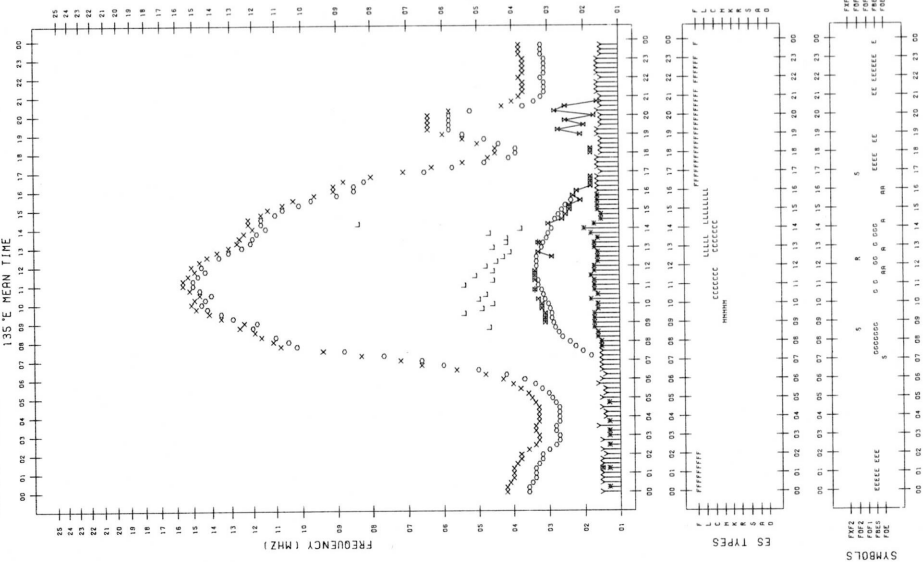
F-plot DATA

STATION : OKINAWA SCALER : R. OTSUKA DATE : 1982/12/23

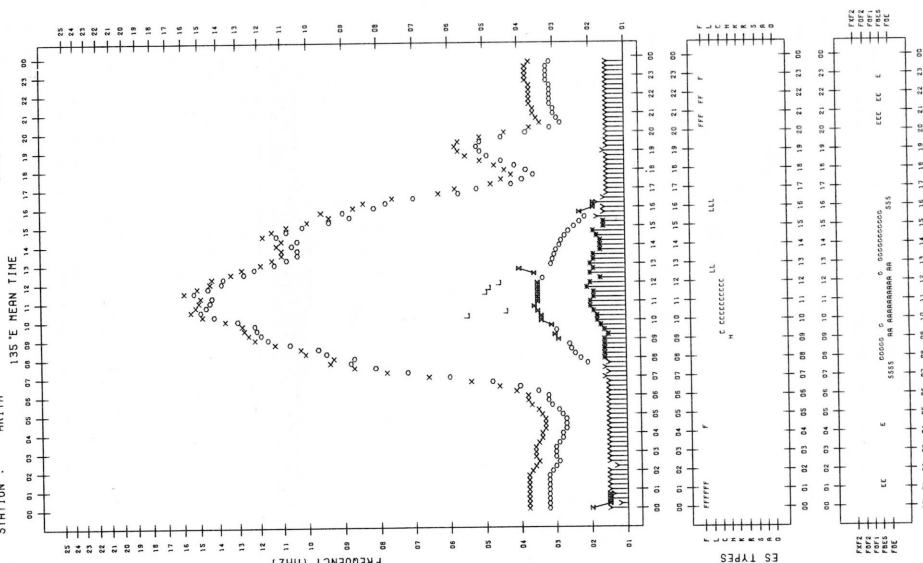
135°E MEAN TIME



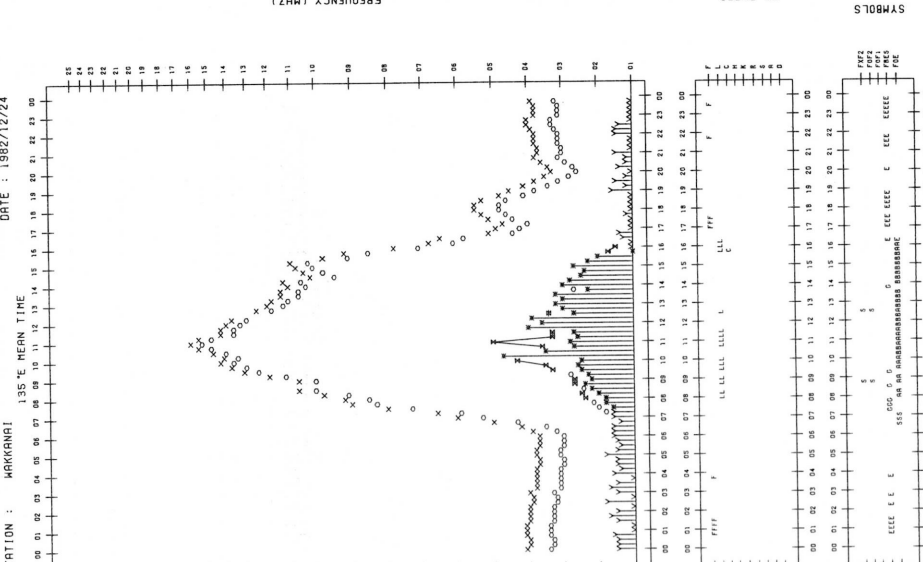
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HI100ME  
DATE : 1982/12/24



F-PLOT DATA  
STATION : AKITA  
SCALER : Y-ECHIZENYA  
DATE : 1982/12/24



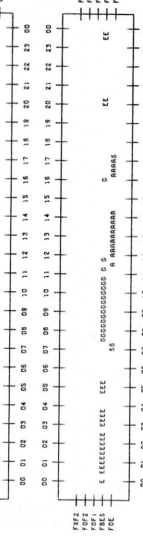
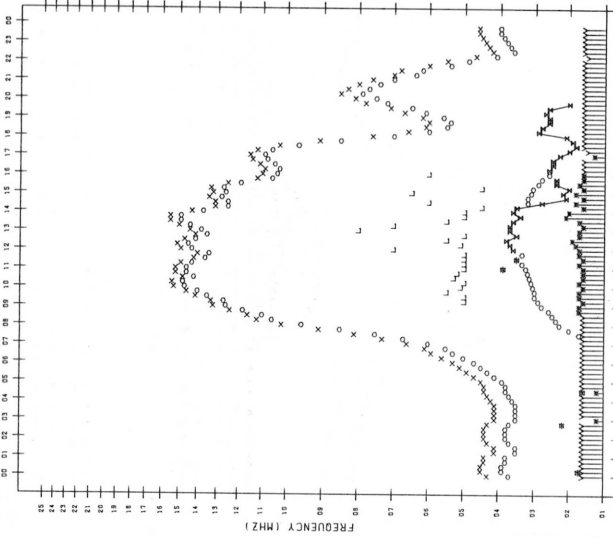
F-PLOT DATA  
STATION : WAKKANAI  
SCALER : T-00A  
DATE : 1982/12/24



F-PLOT DATA

STATION : YAHAGAMA SCALER : H-MITSUDOME DATE : 1982/12/24

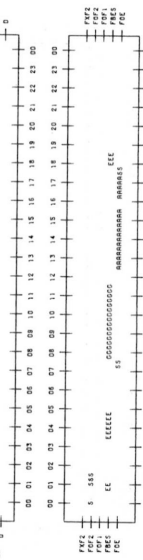
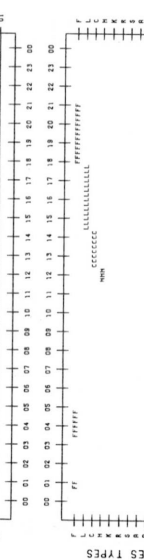
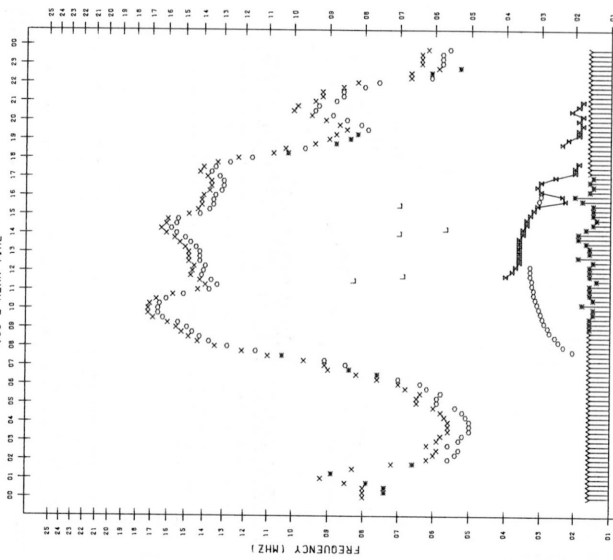
135°E MEAN TIME



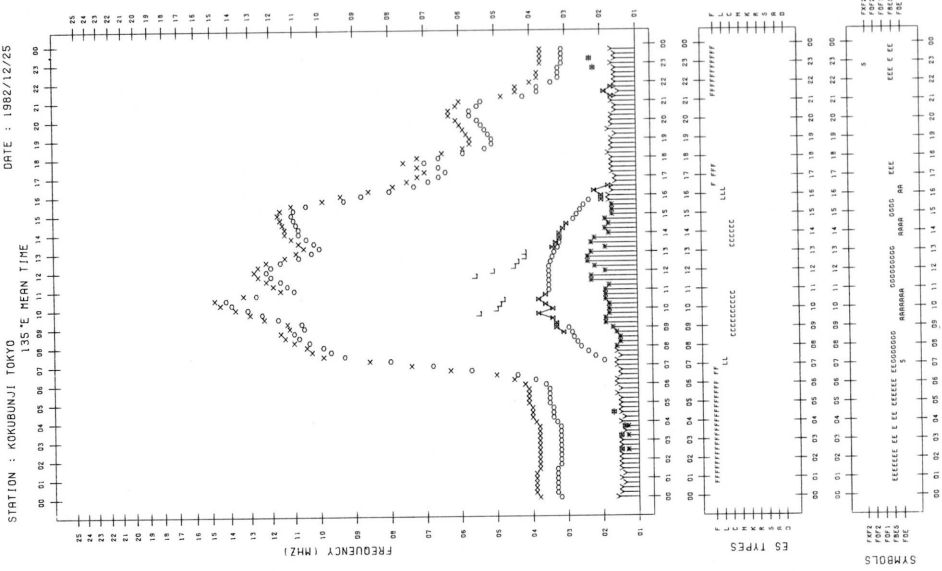
F-PLOT DATA

STATION : OKINAWA SCALER : A-OTSUKA DATE : 1982/12/24

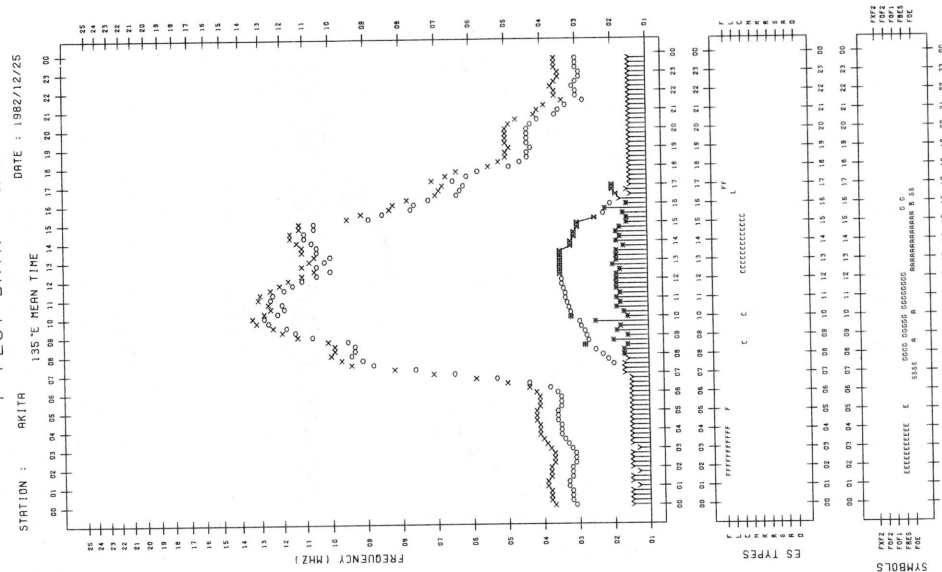
135°E MEAN TIME



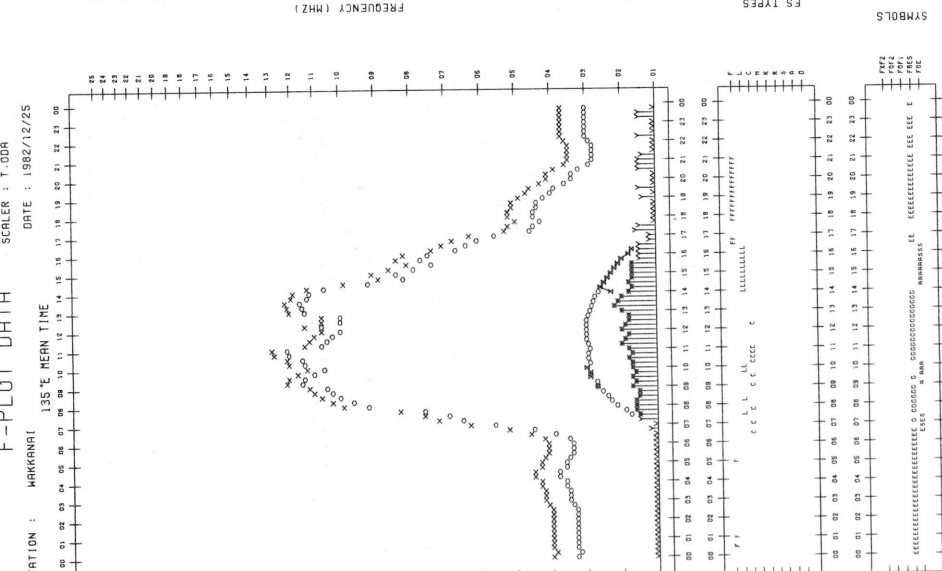
F-plot DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S-HIDOME  
 DATE : 1982/12/25



F-plot DATA  
 STATION : AKITA  
 SCALER : Y-ECHIZENYA  
 DATE : 1982/12/25

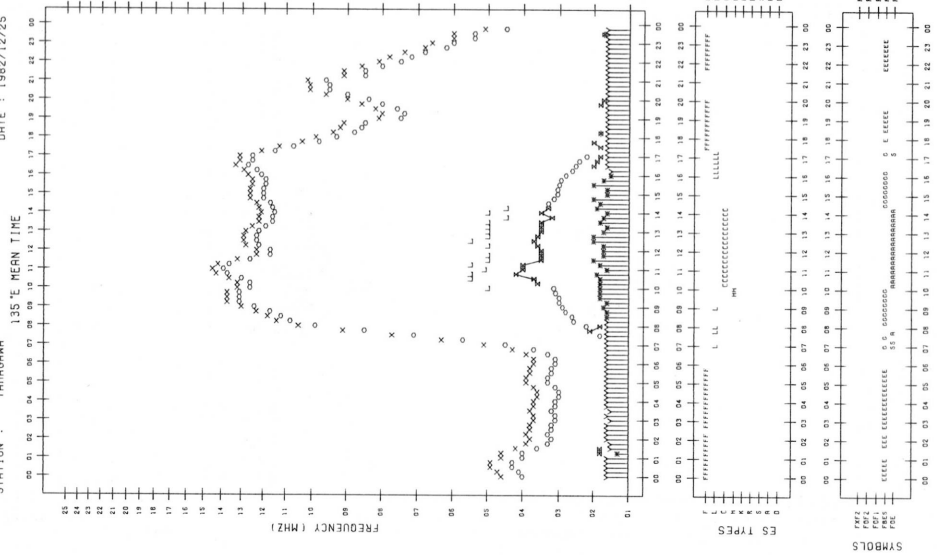


F-plot DATA  
 STATION : WAKKANAI  
 SCALER : Y-ODR  
 DATE : 1982/12/25



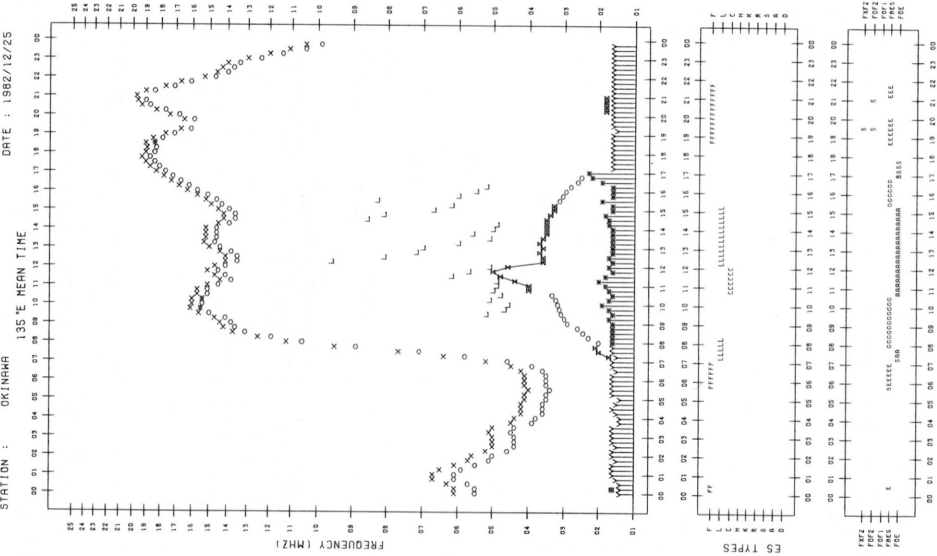
F- PLOT DATA  
STATION : YAHAGARA

SCALER : H. HITSUDOME  
DATE : 1982/12/25

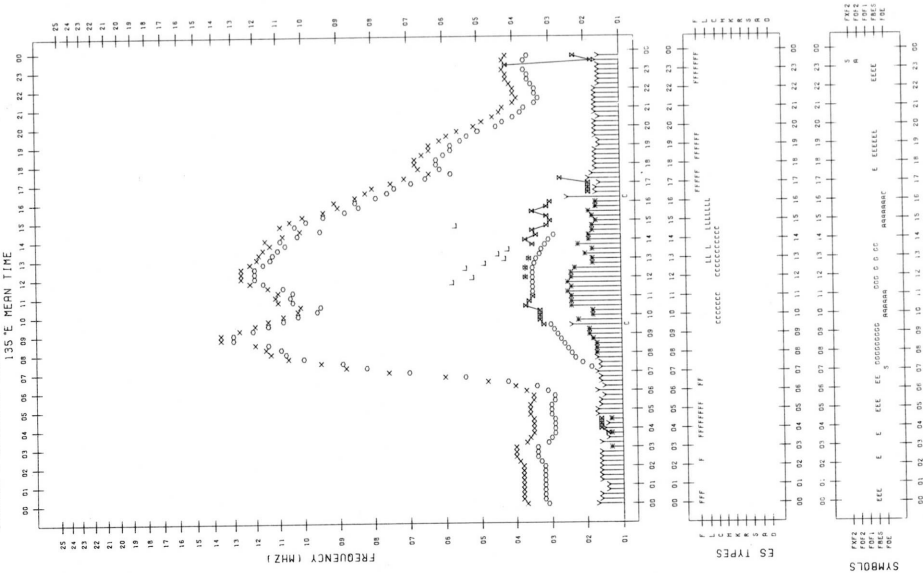


F- PLOT DATA  
STATION : OKINAWA

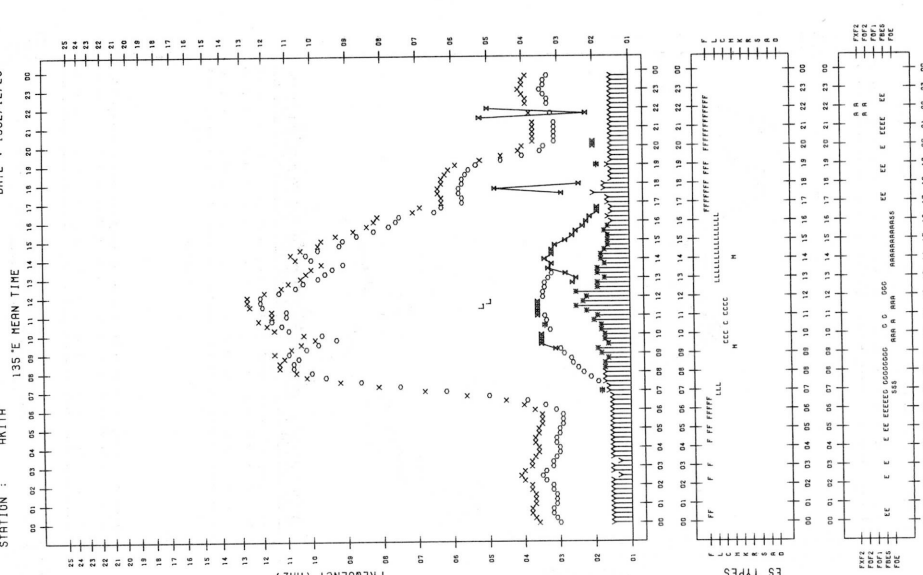
SCALER : H. HRENO  
DATE : 1982/12/25



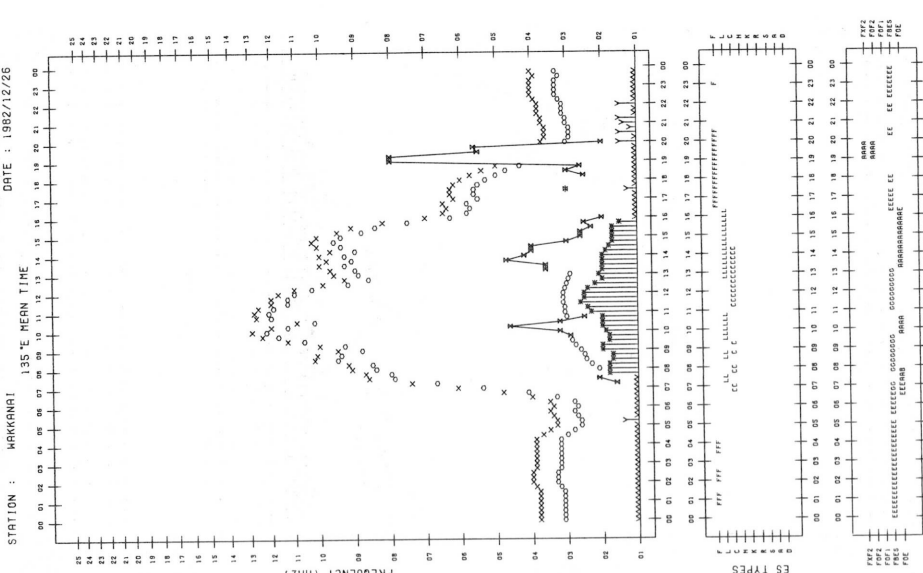
F- PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HIDOME  
DATE : 1982/12/26  
135°E MEAN TIME



F- PLOT DATA  
STATION : AKITA  
SCALER : Y-ECHIZENYA  
DATE : 1982/12/26  
135°E MEAN TIME

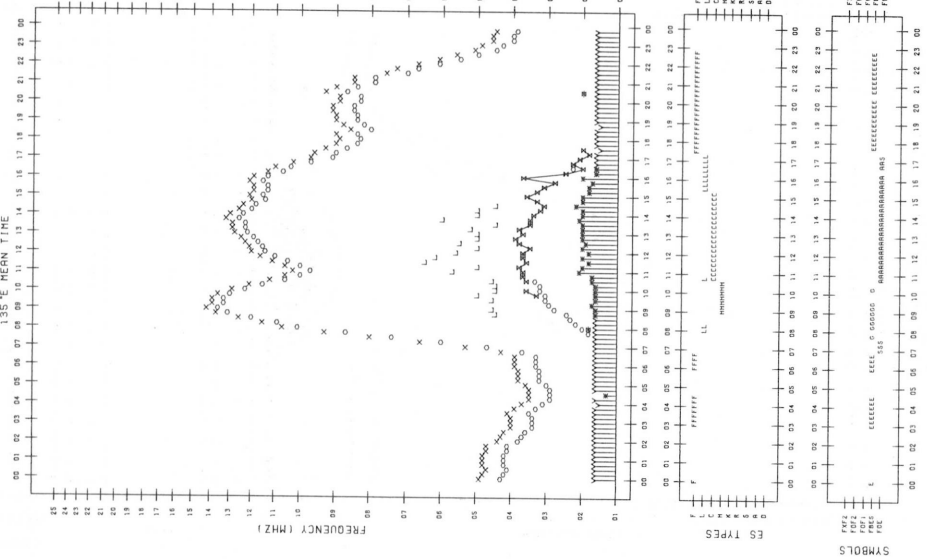


F- PLOT DATA  
STATION : MAKANAI  
SCALER : T-ODR  
DATE : 1982/12/26  
135°E MEAN TIME



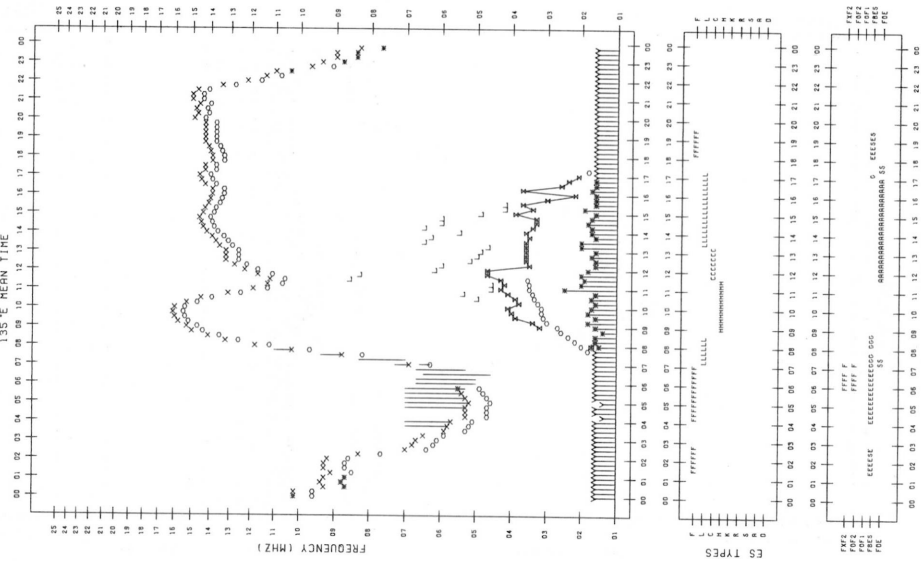
F-PLOT DATA

STATION : YABARAWA SCALER : H.MITSUDDOME DATE : 1982/12/26



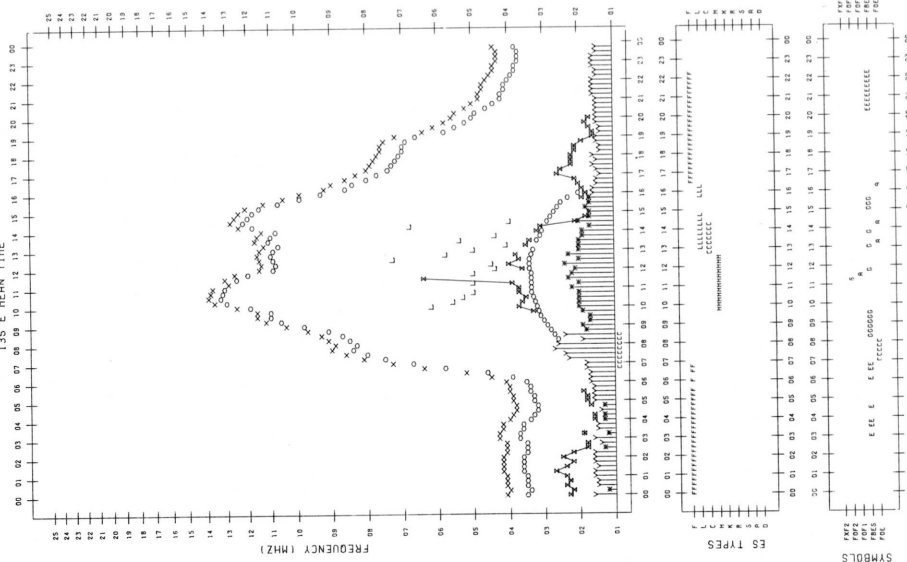
F-PLOT DATA

STATION : OKINAWA SCALER : H.MRENO DATE : 1982/12/26

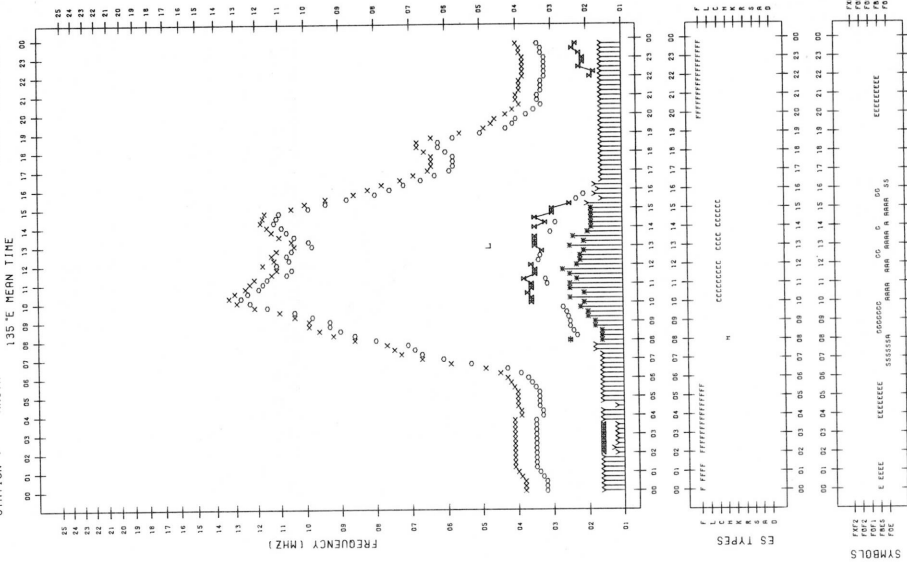




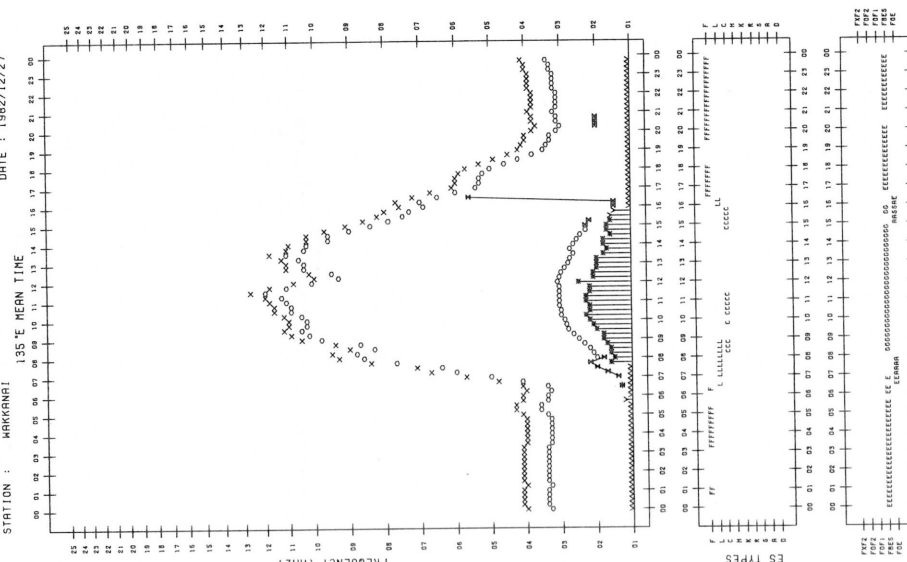
F- PLOT DATA  
 STATION : KOKUBUNJI TOKYO  
 SCALER : S. HIDOME  
 DATE : 1982/12/27  
 135°E MEAN TIME



F- PLOT DATA  
 STATION : AKITA  
 SCALER : T. MORI  
 DATE : 1982/12/27  
 135°E MEAN TIME



F- PLOT DATA  
 STATION : MARIKAWA  
 SCALER : T. ODA  
 DATE : 1982/12/27  
 135°E MEAN TIME

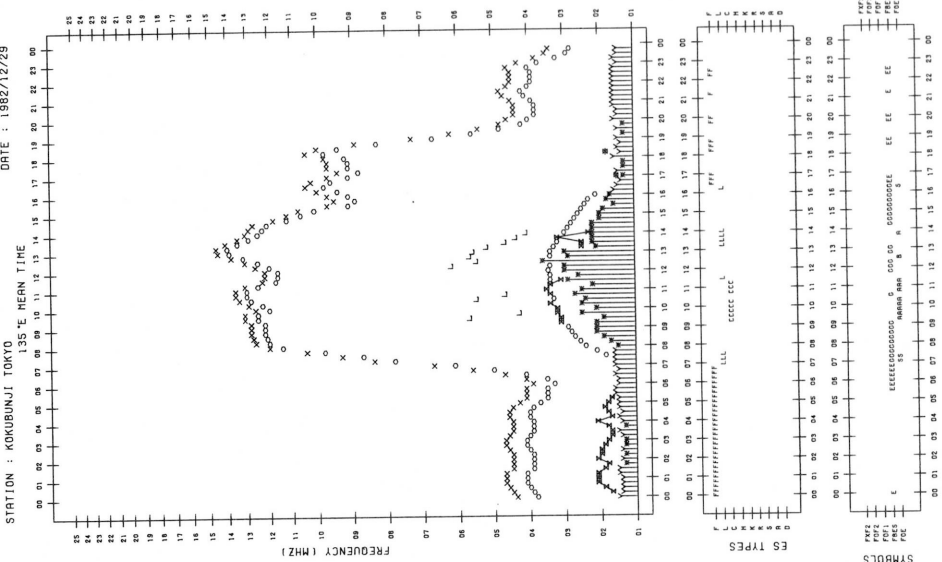




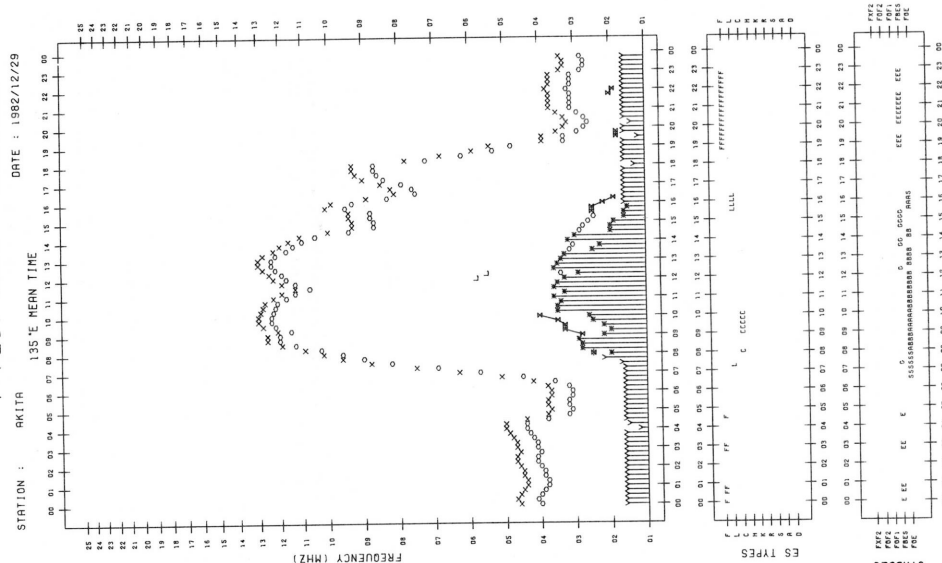




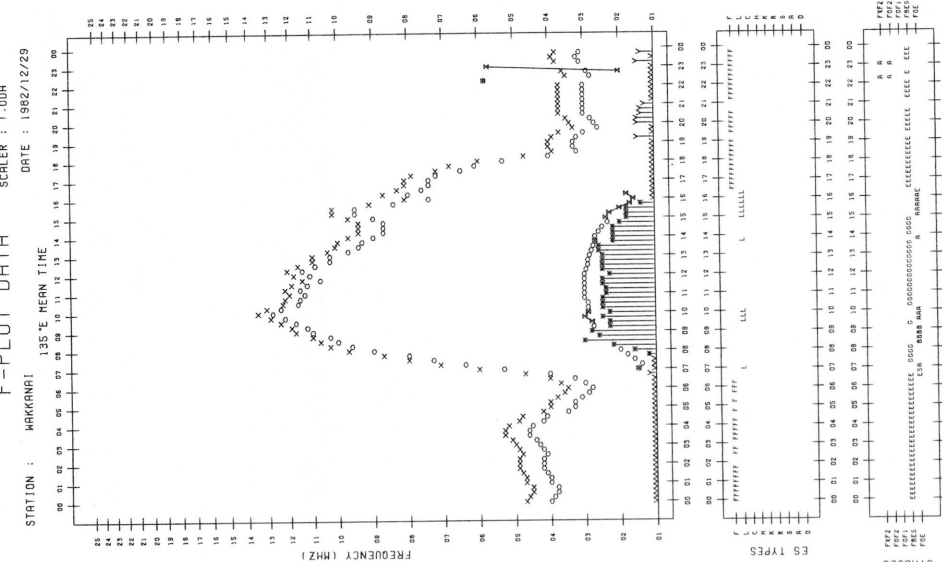
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HIDONE  
DATE : 1982/12/29



F-PLOT DATA  
STATION : AKITA  
SCALER : T-MORI  
DATE : 1982/12/29



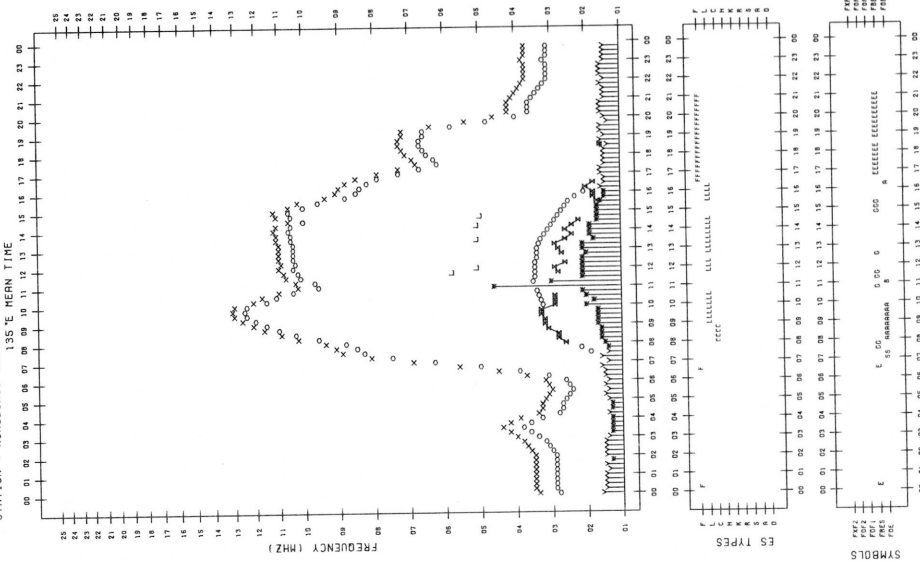
F-PLOT DATA  
STATION : MUKKANRI  
SCALER : T-00A  
DATE : 1982/12/29





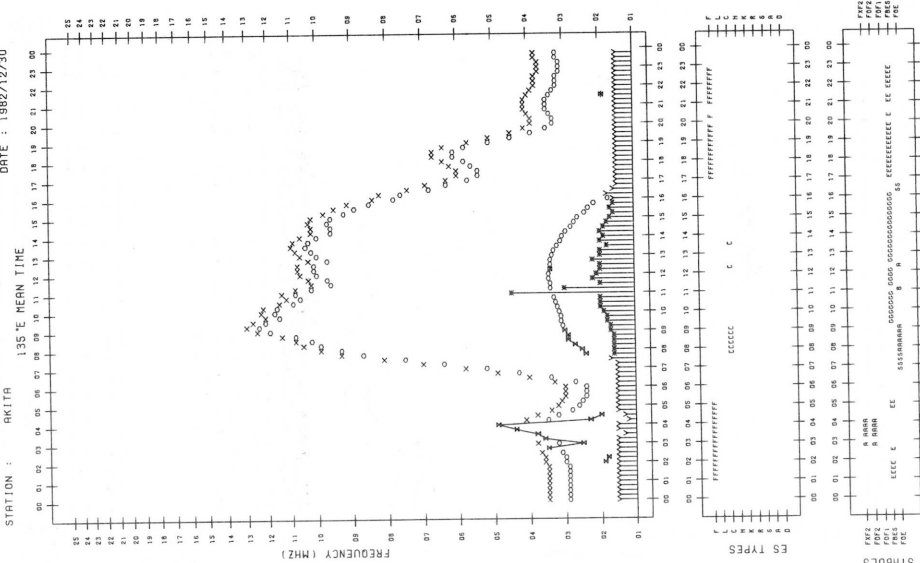
F- PLOT DATA

STATION : KOKUBUNJI TOKYO SCALER : S-HIIDOME DATE : 1982/12/30



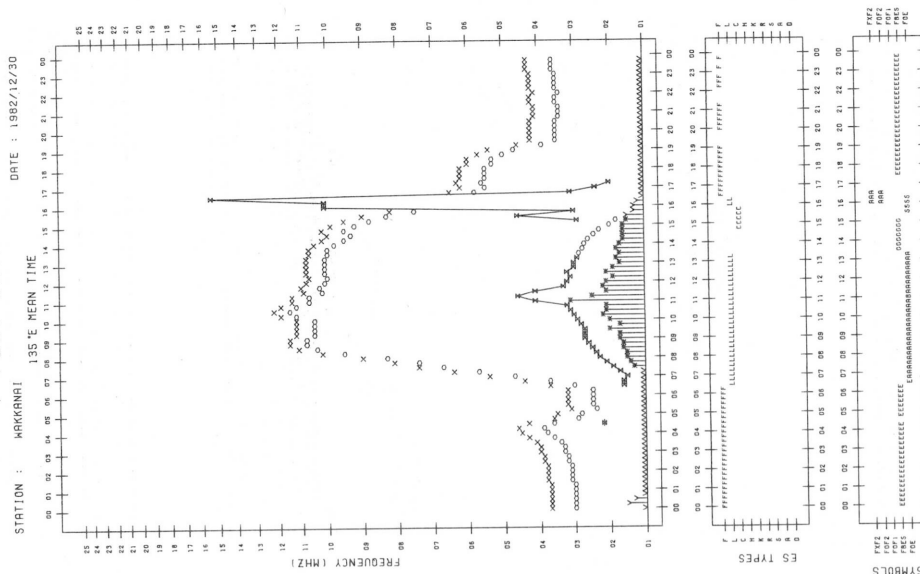
F- PLOT DATA

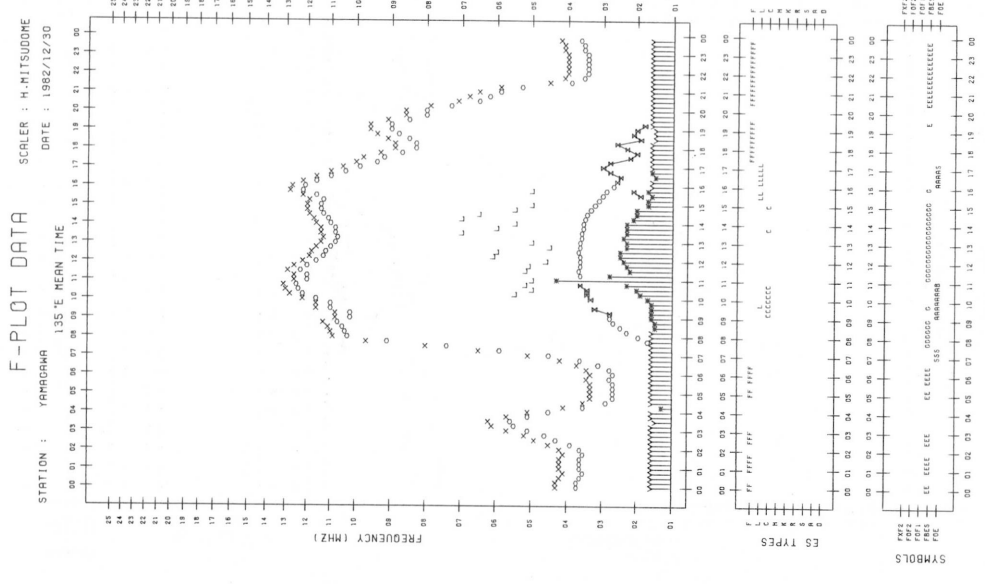
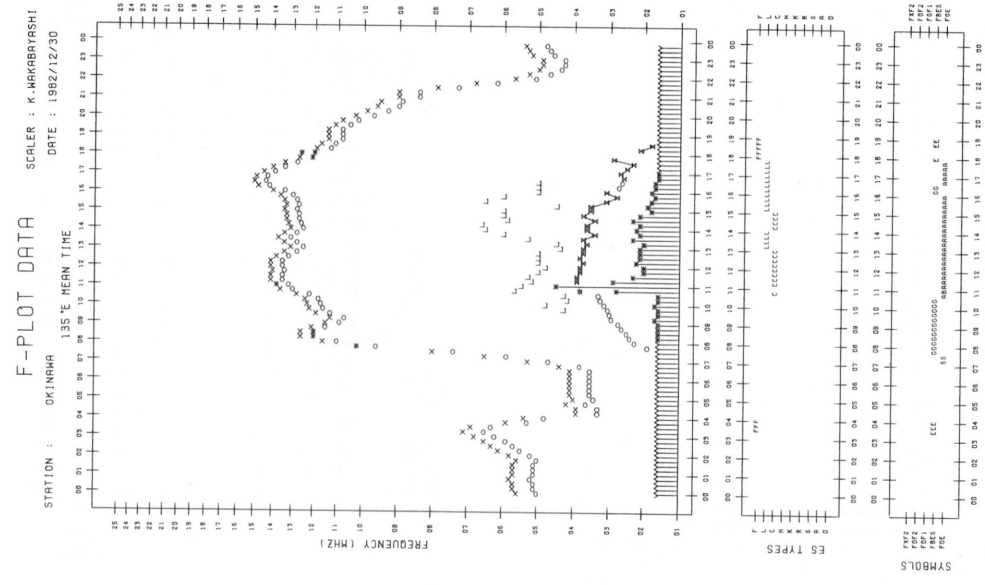
STATION : AKITA SCALER : Y-ECHIZENYA DATE : 1982/12/30



F- PLOT DATA

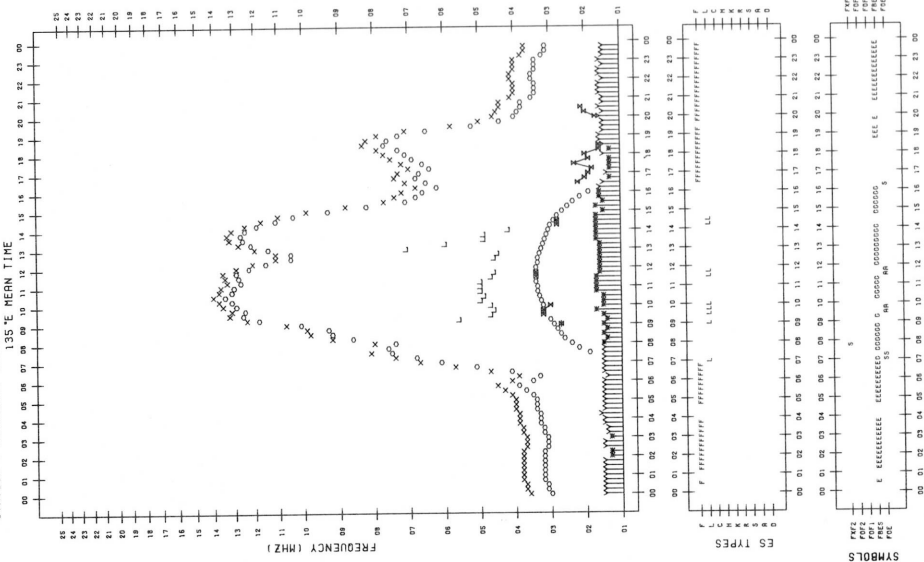
STATION : MAMARAI SCALER : T-ODR DATE : 1982/12/30



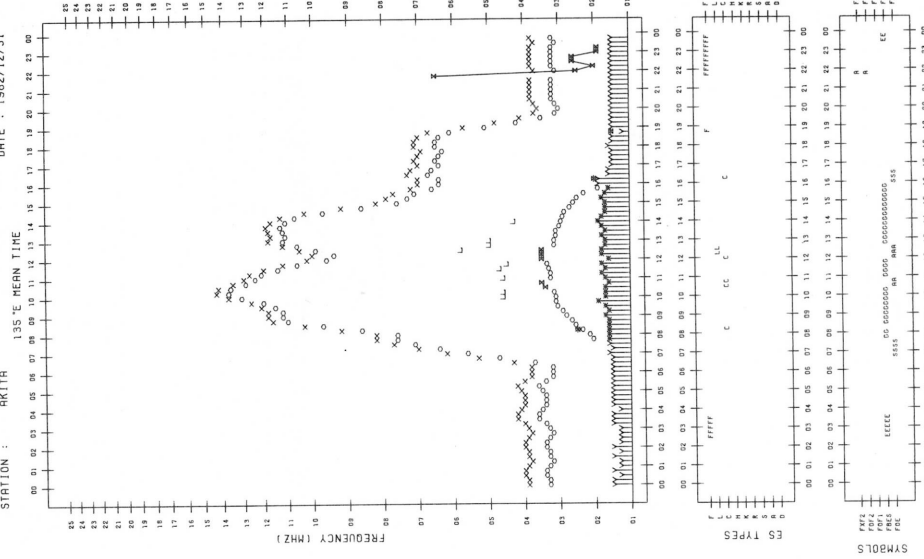




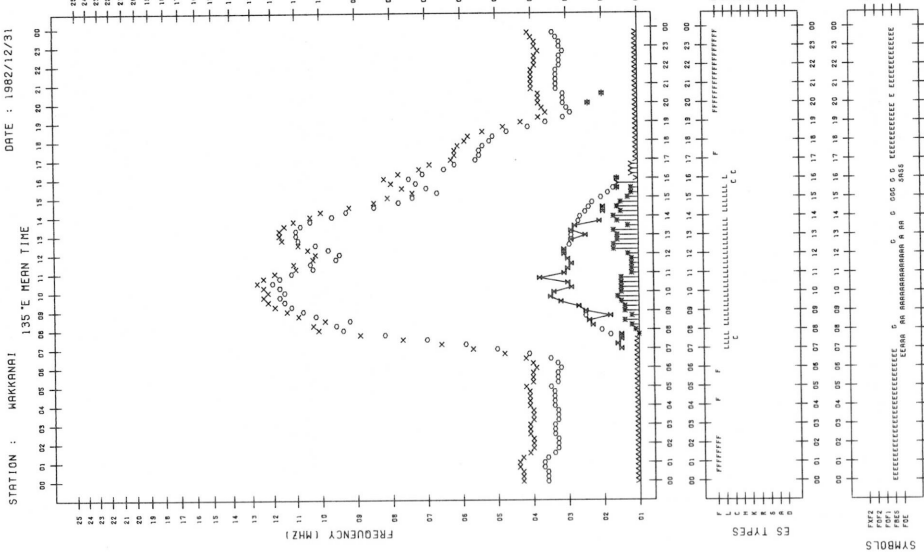
F-PLOT DATA  
STATION : KOKUBUNJI TOKYO  
SCALER : S-HI DOONE  
DATE : 1982/12/31  
135°E MEAN TIME



F-PLOT DATA  
STATION : AKITA  
SCALER : T-ECHIZENYA  
DATE : 1982/12/31  
135°E MEAN TIME



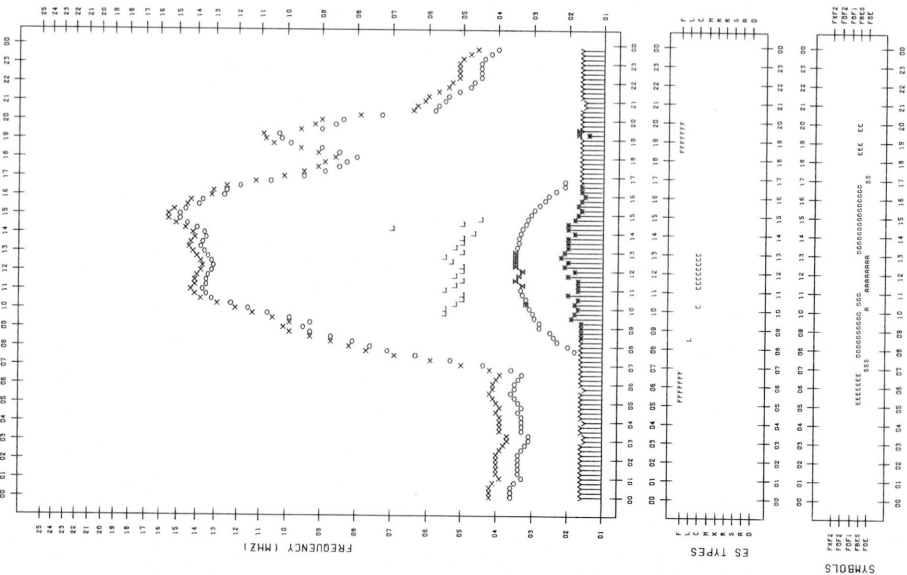
F-PLOT DATA  
STATION : MAKANANI  
SCALER : T.00R  
DATE : 1982/12/31  
135°E MEAN TIME



F- PLOT DATA

STATION : YAMAGAWA SCALER : H-MITSUDOME DATE : 1982/12/31

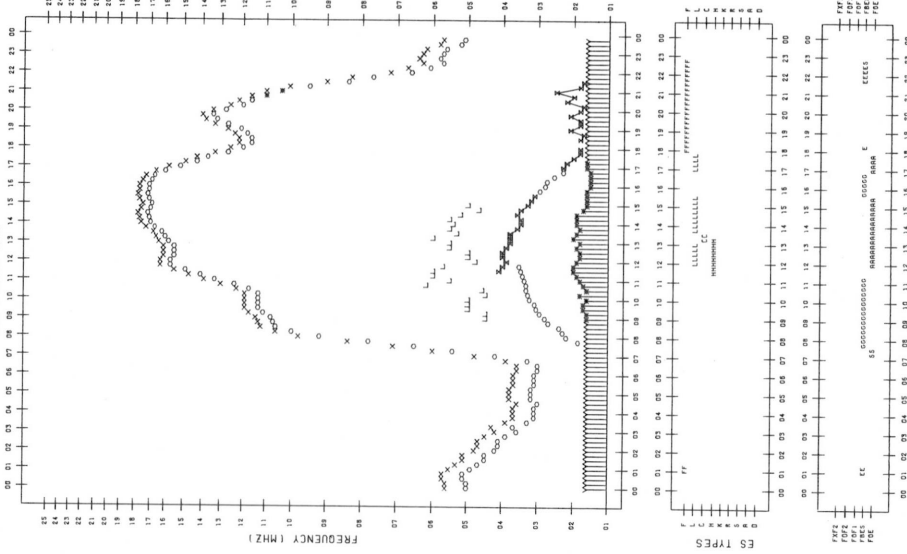
135°E MEAN TIME



F- PLOT DATA

STATION : OKINAWA SCALER : K-KIKUBAYASHI DATE : 1982/12/31

135°E MEAN TIME



## SOLAR RADIO EMISSION

HIRAISO (HIRA)

36.37N 140.62E

Hiraiso Branch, R.R.L.,  
Nakaminato, Ibaraki,  
311-12 JAPAN

December 1982

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

Note No observations during the following periods:

9th 2135 - 2354                      16th 2308 - 17th 0010  
11th 2137 - 12th 0016                20th 2143 - 2341

q: likely quiet.

\*: interference.

## SOLAR RADIO EMISSION

HIRAISO (HIRA)

36.37N 140.62E

Hiraiso Branch, R.R.L.,  
Nakaminato, Ibaraki,  
311-12 JAPAN

December 1982

Single-frequency total flux observations at 500 MHz					
Flux density: $10^{-22} \text{Wm}^{-2} \text{Hz}^{-1}$					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	48	49	(48)	51	48
2	53	52	(51)	53	52
3	53	51	(50)	52	52
4	52	52	(51)	53	52
5	54	55	(53)	62	54
6	59	58	(56)	55	59
7	57	58	(58)	60	57
8	61	59	(58)	55	60
9	56	57	(56)	54	56
10	54	55	(60)	56	55
11	57	58	(56)	-	57
12	55	56	(55)	58	55
13	55	56	(56)	50	56
14	50	52	(52)	50	51
15	50	54	(54)	56	52
16	53	52	(52)	(51)	53
17	50	51	(51)	52	51
18	50	52	(52)	51	51
19	50	49	(51)	45	50
20	44	45	(45)	44	44
21	44	44	(44)	44	44
22	44	44	(43)	44	44
23	45	45	(46)	43	45
24	42	42	(44)	43	42
25	42	43	(44)	46	43
26	45	49	(50)	46	47
27	46	47	(48)	42	46
28	43	44	(44)	44	43
29	44	45	(46)	42	45
30	42	42	(42)	40	42
31	41	41	(42)	40	41

Note No observations during the following periods:

11th 2140 - 12th 0015  
16th 2308 - 17th 0002

## SOLAR RADIO EMISSION

HIRAISO (HIRA)

36.37N 140.62E

Hiraiso Branch, R.R.L.,  
Nakaminato, Ibaraki,  
311-12 JAPAN

December 1982

Outstanding Occurrences									
(single-frequency observations)									
Normal observing period: 2140 - 0730 (sunrise to sunset)									
DEC 1982	FREQ STATION	TYPE	START TIME UT	TIME OF MAXIMUM UT	DUR MIN	FLUX DENSITY		POLARIZATION POSITION REMARKS	
						PEAK	MEAN		
1	100 HIRA	46 C	0028.3	0029.0	1.7	1800	470	O	
	200	46 C	0028.3	0029.1	1.5	105	54	WR	
	100	42 SER	0044.6	0045.0	4.0	1250	-	WL	
2	500	8 S	0259.3	0259.3	0.3	50	35	WR	
	500	1 S	0322.3	0323.9	7	6	3	O	
	200	46 C	0426.3	0426.4	0.8	175	78	MR	
	200	42 SER	0529.4	0550.5	60	167	-	MR	
	100	46 C	0634.3	0642.6	37	2900	163	O	
	200	46 C	0635.3	0642.2	40D	585	34U	O	
	200	44 NS	2130E	2334	590D	10	5	WR	
3	200	44 NS	2130E	0254	595D	45	15	O	
	100	46 C	2302.9	2304.1	4.0	5100	390	O	
4	100	46 C	0009.5	0012.0	6.0	280	48	WR	
	200	46 C	0010.8	0011.8	1.7	73	35	O	
	100	43 NS	0019	0355	380D	2100	490	MR	
	200	45 C	0332.0	0332.7	1.0	870	430	MR	
	200	44 NS	2130E	0248	595D	180	85	MR	
5	100	46 C	0025.3	0026.8	3.6	1700	420	WR	
	500	46 C	0256.5	0302.8	8	130	40	MR	
	100	46 C	0620.1	0621.1	4.0	2100	265	O	
	100	44 NS	2134E	0240	590D	340	170	WR	
	200	44 NS	2134E	0340	590D	170	80	MR	
6	100	41 F	0443.9	0444.6	3.0	8700	-	O	
	200	44 NS	2134E	2335	590D	45	30	MR	
	100	44 NS	2134E	2337	590D	110	75	MR	
	200	46 C	2303.0	2303.5	1.3	260	90	WR	
	200	42 SER	0130	0130.5	8.7	500	-	SR	
7	100	44 NS	2134E	0420	590D	230	120	MR	
	200	44 NS	2134E	0422	590D	120	60	MR	
	100	46 C	2221.5	2222.7	1.3	2400	546	MR	
	200	46 C	2236.3	2238.6	4.0	190	47	WL	
	500	7 C	2245.6	2246.8	1.7	20	6	SR	
	100	46 C	2258.1	2258.5	1.8	2100	830	O	
	500	7 C	2300.5	2302.6	2.6	17	6	SR	
	200	46 C	2304.6	2305.2	1.0	310	80	O	
	500	48 C	2337.4	0018.8	69	2900	500	WR	
				2342.7			1000		O
				0002.9			1600		WL
		200	48 C	2340.4	2344.7	56	70000	810	O
				2348.6			3400		WR

DEC 1982	FREQ STATION	TYPE	START TIME UT	TIME OF MAXIMUM UT	DUR MIN	FLUX DENSITY		POLARIZATION POSITION REMARKS	
						PEAK	MEAN		
8	100 HIRA	48 C	2343.5	2357.7 -	51	1100 10000D	1850D	0 -	
	200	46 C	0039.0	2359.5 0040.0	1.7	9100 315	70	WL MR	
	500	42 SER	0106.6	0107.2	10	6	-	0	
	500	42 SER	0119.1	0121.1	4	8	-	SR	
	100	7 C	0119.2	0119.5	5.0	4500	480	0	
	500	5 S	0132.6	0134.4	5.3	6	3	0	
	100	8 S	0134.5	0135.0	0.8	1600	-	WL	
	500	3 S	0206.6	0207.0	1.0	40	15	SR	
	100	46 C	0227.1	-	5.6	10000D	1180D	-	
	500	46 C	0229.2	0231.4	3	75	15	SR	
	200	42 SER	0229.4	0229.6	2.7	1900	-	WR	
	200	8 S	0331.7	0331.8	0.7	640	-	0	
	100	42 SER	0421.2	0421.7	9.7	4800	-	WR	
	9	200	44 NS	2135E	0539	590D	30	20	0
200		44 NS	2354E	0120	450D	15	5	WL	
100		44 NS	2354E	0506	400D	70	30	0	
200		7 C	0013.1	0013.3	1.0	320	54	MR	
10	200	8 S	0401.3	0401.3	0.3	85	-	ML	
	200	7 C	0441.3	0442.7	2.1	3500	130	WL	
	100	45 C	0442.3	0442.5	0.9	1300	240	WL	
	500	22 GRF	0442.3	0557.5	80	10	6	SL	
	200	42 SER	0505.3	0519.5	15	87	-	ML	
	100	24 R	0521	0600	120D	280	90	ML	
	200	24 R	0523	0555	114D	45	23	ML	
	200	46 C	0545.7	0547.6	3.1	130	55	ML	
	200	44 NS	2137E	0618	580D	110	60	ML	
	100	44 NS	2137E	0630	580D	1500	490	WL	
	11	500	45 C	0030.4	0031.6	5.3	15	6	0
		500	8 S	0048.9	0049.2	0.3	100	-	0
		500	8 S	0141.0	0141.0	0.4	400	-	0
		200	8 S	0141.2	0141.4	0.6	1250	-	WL
100		7 C	0438.8	-	3.9	10000D	2300D	-	
200		7 C	0439.1	0439.5	3.0	2720	350	WL	
500		45 C	0439.2	0443.4	10	32	15	0	
200		46 C	0451.4	0453.4	8.0	90	30	WL	
500		45 C	0452.6	0453.0	6	12	3	0	
12		100	44 NS	0016E	0514	430D	1800	1100	ML
		200	44 NS	0016E	0520	430D	70	50	ML
		500	20 GRF	0110	0204	207	8	3	0
		200	44 NS	2140E	0519	580D	180	125	ML
		100	44 NS	2140E	0532	580D	2300	1200	ML
	500	20 GRF	2304	2337.9	72	10	4	0	
13	100	46 C	0323.7	-	5.7	10000D	3650D	-	
	200	46 C	0323.8	0324.6	4.0	350	170	ML	
	500	3 S	0324.0	0325.7	11	95	30	WL	
	200	44 NS	2140E	0215	580D	45	40	ML	
14	100	44 NS	2140E	0547	580D	1800	1100	ML	
	200	46 C	0011.3	0012.0	3.0	310	140	WL	
	100	44 NS	2140E	0000	580D	2000	435	WL	
	200	44 NS	2140E	0143	580D	60	25	ML	
15	100	48 C	0156.1	-	18	10000D	4300D	-	
	200	48 C	0157.0	0200.5	39	56000	1230	WR	
	500	48 C	0157.4	0201.7	40	3700	400	WR	

DEC 1982	FREQ	STATION	TYPE	START TIME UT	TIME OF MAXIMUM UT	DUR MIN	FLUX DENSITY		POLARIZATION POSITION REMARKS
							PEAK	MEAN	
16	200	HIRA	46 C	0257.1	0304.5	20.7	150	33	WL
	200		46 C	0318.3	0321.3	51	260	64	ML
					0335.3		190		WL
	200		46 C	0410.5	0445.3	98	100	30	WL
					0530		105		WL
	100		44 NS	2141E	2330	570D	30	10	WR
	200		44 NS	2141E	0050	570D	15	5	WR
	500		45 C	2211.7	2213.8	2.5	95	55	SR
	200		41 F	0308.7	0309.0	7.0	190	-	MR
	200		46 C	0535.3	0537.1	3.4	95	18	ML
17	200		46 C	0617.0	0617.3	3.3	17	4	WL
	500		8 S	0632.6	0632.8	0.5	160	-	WL
	500		48 C	0145.2	0148.6	12	2500	300	SL
	200		42 SER	0145.3	0149.0	51	9400	-	WL
	100		48 C	0148.0	0149.2	7.1	10000D	1460D	-
	100		24 R	0208	0400	320D	120	78	SL
	200		24 R	0312	0455	240D	27	15	ML
	100		46 C	2138E	2146.5	19D	10000D	395D	- , SUNRISE
	200		46 C	2141E	2147.4	34D	1400U	70U	ML, SUNRISE
	200		41 F	0258.0	0303.6	10.5	78	-	ML
18	500		45 C	0301.0	0302.4	2.0	40	25	SL
	500		45 C	0413.4	0430.1	36	110	60	SL
	500		42 SER	2240.5	2243.6	12	500	-	SL
	500		7 C	2327.7	2328.4	2	90	15	SL
	200		46 C	0056.6	0057.2	1.2	245	53	0
	500		48 C	0133.6	0136.9	10	9000	1500	SL
	200		41 F	0133.7	0135.2	9.4	290	-	WL
	100		41 F	0133.7	0137.3	7.0	5200	-	WL
	500		1 S	0420.7	0422.6	3.3	5	3	SL
	500		45 C	0452.0	0454.3	3.0	1200	500	SL
19	200		46 C	0452.7	0453.4	1.6	165	55	WL
	500		45 C	0458.2	0500.6	5.5	38	20	ML
	100		42 SER	0624	0652	32	7000	-	0
	500		42 SER	0635.2	0640.7	20	250	-	SL
	500		45 C	2249.4	2250.2	4	100	30	SL
	500		45 C	2254.7	2256.3	4	400	200	SL
	200		42 SER	0124.0	0124.2	14	80	-	0
	200		42 SER	0124.6	0128.6	4.7	112	-	0
	100		46 C	0125.0	0126.0	2.7	280	75	0
	100		46 C	0129.0	0130.6	7.1	1100	290	0
20	200		45 C	0339.5	0340.6	2.0	12000	3400	WL
	100		45 C	0340.1	-	2.3	10000D	2450D	-
	500		7 C	0340.4	0340.4	2.4	14	4	SL
	100		46 C	0416.3	0416.5	1.3	850	230	0
	100		46 C	0212.0	0214.3	3.4	170	76	0
	200		45 C	0212.7	0213.0	2.0	68	27	WR
	500		7 C	0423.2	0423.6	1.0	140	15	0
	100		8 S	0446.8	0447.1	0.4	560	-	WL
	200		46 C	0451.6	0452.3	1.1	565	130	WR
	500		7 C	0458.4	0458.7	1.4	10	6	0
21	100		46 C	0612.0	0612.8	3.0	2000	270	WL
	200		46 C	0612.3	0612.7	2.0	375	21	0
	100		46 C	0645.4	0645.4	2.3	10000D	4800D	-
	200		46 C	0645.4	0645.5	1.4	42	13	0
	22	100	46 C	0133.0	0133.8	2.0	7000	1110	WL

DEC 1982	FREQ STATION	TYPE	START TIME UT	TIME OF MAXIMUM UT	DUR MIN	FLUX DENSITY		POLARIZATION POSITION REMARKS	
						PEAK	MEAN		
24	500 HIRA	8 S	0133.4	0134.0	0.6	7	4	SR	
	200	8 S	0133.7	0134.0	0.6	73	-	0	
	200	41 F	0206.8	0206.8	2.7	610	-	0	
	100	46 C	0207.0	0207.6	2.7	3200	830	WL	
	100	46 C	0124.3	0124.5	1.2	4100	810	0	
	100	46 C	0453.4	0453.6	0.9	2900	530	0	
	100	8 S	2338.0	2338.0	0.3	1500	-	WL	
	100	46 C	2343.8	2344.3	1.0	2300	240	0	
	25	100	46 C	0128.0	0128.6	1.0	1200	370	0
		100	45 C	0243.3	0243.5	0.9	5400	900	WL
200		7 C	0243.3	0243.6	2.4	385	34	0	
100		44 NS	2147E	0506	580D	160	80	SR	
26	200	44 NS	2147E	0545	580D	65	40	MR	
	200	45 C	2305.0	2305.6	1.0	90	54	MR	
	200	46 C	0010.8E	0012.7	5.6D	11000	295	0	
	100	48 C	0011.0E	0012.7	3.7D	10000D	2490D	-	
	500	45 C	0011.2	0012.6	6	500	150	SR	
	200	45 C	0203.8	0204.2	1.0	240	90	SR	
	200	46 C	0700.2	0700.8	1.1	210	145	SR	
	200	44 NS	2147E	0314	580D	90	60	MR	
	100	44 NS	2147E	0337	580D	600	390	SR	
	27	500	8 S	0116.1	0116.2	0.4	15	10	0
100		46 C	0144.3	0144.7	0.9	280	210	SR	
500		7 C	0147.1	0148.8	2	15	6	0	
500		7 C	0159.3	0200.0	1.0	35	25	WR	
100		46 C	0312.5	0316.6	5.7	540	220	MR	
500		7 C	0313.0	0314.6	3.6	7	2	MR	
100		48 C	0523.4	0523.8	3.5	7600	2800	0	
200		46 C	0523.7	0524.1	8.0	1140	103	WR	
				0528.2		950		0	
		500	46 C	0523.7	0524.4	7.3	1000	100	SR
28				0527.7		450		SR	
	100	46 C	0527.2	0527.5	1.6	1400	640	0	
	200	44 NS	2147E	0007	580D	115	65	MR	
	100	44 NS	2147E	0115	580D	1500	890	SR	
	100	46 C	2235.8	2235.9	0.9	10000D	2450D	-	
	500	42 SER	0028.3	0032.7	5.3	28	-	MR	
	200	42 SER	0257.6	0303.1	7.0	1350	-	WR	
	500	42 SER	0304.6	0306.7	6	500	-	WR	
	100	44 NS	2147E	0200	580D	300	175	SR	
	200	44 NS	2147E	0545	580D	55	20	MR	
29	100	46 C	0350	0350.3	1.0	1380	410	0	
	100	42 SER	0629.7	0631.0	3.3	1200	-	0	
	500	48 C	0644.0	0644.1	42D	14000	250	WL	
	200	48 C	0644.2	-	9.3	70000D	12900D	0	
	100	48 C	0646.0	0647.1U	11.2	10000D	3800D	-	
	200	46 C	0655.4	0709.0	30D	250	46	WR	
				0658.3		120		0	
	200	44 NS	2148E	2350	580D	10	5	WR	
	100	41 F	2322.3	2323.8	5.0	310	-	MR	
	100	46 C	2347.3	2349.3	4.0	220	75	0	
30	500	7 C	2347.4	2348.3	1.0	20	10	WR	
	500	46 C	0147.6	0149.7	2.6	200	20	WR	
	100	46 C	0157.0	0157.5	1.2	1500	380	0	
	100	42 SER	0217.0	0220.1	3.3	1800	-	0	
	200	HIRA	46 C	0218.6	0219.4	1.0	175	82	0
	100		46 C	0335.6	0336.8	2.0	1200	268	0
31	200	41 F	0335.7	0336.6	2.0	120	-	WR	
	100	42 SER	0359.3	0404.8	7.3	1150	-	0	
	200	46 C	0600.9	0603.7	5.6	1300	67	0	
	100	46 C	0603.4	0603.7	1.7	5400	2200	WL	
	200	42 SER	2355.0	2359.0	7.0	67	-	0	
	100	42 SER	2355.1	2358.6	7.4	560	-	0	
	200	42 SER	0220	0242.5	23	260	-	0	
	100	42 SER	0231.0	0242.9	17	1600	-	WL	
	200	41 F	0349.3	0349.6	7.0	47	-	0	





RADIO PROPAGATION

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

DEC 1982		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	-1	3	7	11	16	14	16	-8	-8	ES -1	ES -23	ES -23	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	2	6	3	2									
2	1	4	6	11	21	20	-3	2	0	ES -15	ES -24	ES -3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	1	7	-2	2									
3	-1	-2	9	9	13	15	10	17	ES -5	ES -9	ES -3	ES -3	ES -15	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-2	5	2	-2									
4	2	0	7	10	14	16	11	ES 3	ES -9	ES -6	-9	ES -6	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-1	3	-2	10									
5	-1	3	3	14	13	16	C	20	10	9	-2	ES -3	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-2	5	-1	-2									
6	1	6	2	8	12	13	19	16	-2	ES -9	-7	ES -7	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-3	-9	-2	-6									
7	-3	-3	3	2	5	16	10	20	14	ES -3	ES -7	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	5	-3	2	ES -24									
8	ES -24	ES -15	ES -9	5	15	17	15	17	11	15	17	-6	ES -4	ES -15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-7	1	5	-1									
9	-2	-1	-2	11	14	17	25	19	10	ES -3	ES -5	ES -11	ES -15	ES -15	ES -24	ES -24	ES -15	-7	ES -7	ES -24	ES -24	ES -24	ES -24	ES -24	-2	0	-2	-6									
10	ES -24	ES -11	ES -24	8	4	17	20	21	21	21	15	18	18	19	6	-2	ES -9	ES -9	ES -9	ES -9	4	9	6	3	0												
11	1	1	5	10	2	15	19	21	9	ES 2	-3	3	-4	-4	ES -15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	6	6	6	1									
12	3	4	13	5	21	23	29	24	21	11	1	-4	-3	-3	ES -6	ES -15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	-9	6	14	7	6							
13	4	4	10	1	15	18	16	16	18	ES -2	ES -3	ES -15	-9	ES -9	ES -9	ES -3	ES -3	ES -3	ES -3	ES -3	ES -3	ES -3	ES -3	ES -3	7	4	2	5									
14	4	4	9	14	18	24	24	16	20	15	-9	ES 7	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	1	6	0	0									
15	2	3	-3	11	17	20	22	16	11	ES -2	1	-9	16	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-2	5	-3	-2									
16	6	6	9	13	17	18	17	14	17	11	9	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-4	7	3	C									
17	C	C	7	11	16	19	21	18	16	19	18	15	10	2	-3	-8	ES -25	20	22	0	-3	0	0	-3	0	0	-3										
18	5	5	8	11	15	18	20	11	16	10	-2	6	16	ES 3	-3	ES -24	ES -24	5	17	13	12	6	0	2													
19	0	-1	5	11	17	18	22	17	14	13	3	ES -6	ES -24	ES -24	3	ES -9	3	-2	-6	ES -24	-1	-8	-8	-8													
20	-5	-5	-2	7	13	17	21	22	18	9	-3	ES -20	ES -20	ES -9	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	3	2	1	-1										
21	0	0	4	10	14	16	16	21	4	10	ES 2	ES -2	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-9	-3	2	5	0								
22	4	4	10	15	19	17	19	18	-6	ES -9	ES -1	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-1	7	3	2									
23	0	4	7	11	19	16	16	-3	8	-3	ES -5	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	1	5	7	2									
24	5	4	7	13	16	15	8	10	ES -15	ES -24	ES 3	ES -11	ES -11	ES -15	ES -15	ES -9	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	-5	9	3	9									
25	4	6	6	14	14	16	14	24	8	ES -9	ES -5	ES -2	ES -9	ES -9	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	ES -15	-9	ES -24	7	7	7	3							
26	2	7	9	13	15	11	8	18	6	10	ES -15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-3	6	3	3									
27	-3	-4	1	2	7	12	8	10	10	ES -6	ES -24	ES -24	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	ES -25	-10	-3	-7	-16						
28	C	-5	-4	-1	8	19	19	11	9	ES -5	ES -5	ES -8	4	ES -5	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-10	10	8	-4									
29	ES -7	-10	-1	4	8	11	15	16	10	6	ES -10	ES -10	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	ES -7	1	6	6	6									
30	3	-4	2	11	12	13	13	12	ES -2	ES 5	ES -6	ES -6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	3	5	3	6									
31	2	7	8	S	11	16	11	ES -10	ES -9	ES -1	ES -9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	1	6	8	7									
CNT	29	30	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30								
MED	1	3	6	11	14	16	16	16	10	ES -1	ES -3	ES -7	ES -23	ES -15	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-1	5	3	0									
UD	5	6	10	14	19	20	24	22	20	15	15	ES 7	16	ES 2	-3	ES -7	ES -7	-2	ES -3	0	7	9	7	7													
LD	ES -7	-10	-4	2	5	12	8	ES -3	ES -9	ES -9	ES -23	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	-7	-3	-3	-8									

RADIO PROPAGATION

RADIO PROPAGTION QUALITY FIGURES

HIRAISO

Time in U.T.

Dec. 1982	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	4-	4U	S	S	3U	4	3U	S	4	N	N	N	N			
2	4-	4	S	S	3U	4	3U	S	4	N	N	N	N			
3	4-	4	4U	S	4	4	3U	S	4	N	N	N	N			
4	4-	4	S	S	4U	4	3U	S	4	N	N	N	N			
5	4-	4	4U	S	3U	4	4U	S	4	N	N	N	N			
6	4-	3	4U	S	3U	4	4U	S	4	N	N	N	N			
7	4-	3	S	S	4U	4	4U	S	3U	N	N	N	N	0329	---	134
8	4o	4	S	S	5	3	4U	S	4	N	N	N	N	---	---	
9	4o	4	S	5U	5	4	4U	S	3	N	N	N	N	---	03.0	
10	4+	4	S	5U	4	3	5U	5U	4	N	N	N	N	0722	---	94
11	4+	5	S	S	4U	4	4U	5U	4	N	N	N	N	---	06.0	
12	5-	5	4U	5U	4	4	5U	5U	5	N	N	N	N			
13	4o	4	S	5U	4	4	4U	S	4	N	N	N	N			
14	4+	4	S	S	4	4	5U	S	4	N	N	N	N			
15	4-	3U	S	S	4	4	4U	S	4	N	N	N	N			
16	4+	4	S	S	4U	4	5U	S	4U	N	N	N	N			
17	4+	4U	5U	S	4U	4	5U	5U	4	N	N	N	N	0806	---	136
18	4+	4U	S	5U	4	4	5U	5U	4	N	N	N	N	---	---	
19	4o	4U	S	5U	3U	4	5U	5U	3	N	N	N	N	{ 0254	---	153
20	4o	4	4U	S	3U	4	5U	S	4	U	U	U	U	{ 2222	---	159
														---	---	
21	4-	3U	5U	S	3U	4	4U	S	4	N	N	N	N	---	---	
22	4-	4	4U	S	3U	4	3U	S	4	N	N	N	N	---	20.0	
23	4-	4	S	S	4	4	3U	S	4	N	N	N	N			
24	4-	4	S	S	3U	4	3U	S	4	N	N	N	N			
25	4o	4U	4U	S	4U	4	4U	S	4	N	N	N	N			
26	4-	4	S	S	3U	4	4U	S	4	N	N	N	N			
27	3+	4U	4U	S	3U	3	3U	S	3	N	N	N	N			
28	3+	3U	S	S	3U	3	4U	S	4	N	N	N	N			
29	4-	3U	S	S	4U	3	4U	S	4	N	N	N	N			
30	4-	3	S	S	4U	4	4U	S	4	N	N	N	N			
31	4-	4U	S	S	4U	4	2U	S	4	N	N	N	N			

RADIO PROPAGATION

SUDDEN IONOSPHERIC DISTURBANCES

HIRAISO

Time in U.T.

Dec. 1982	S W F							Correspondence			
	Drop-out Intensities (dB)				Start	Duration	Type	Imp.	Solar Flare	Solar Noise	Geomag. Crochet
	CO	HA	1)	2)							
3			12		0110	68	SL	1	x	x	
3			10		2300	11	SL	1-	x	x	
7	7		8		0222	22	S	1-	x	x	
7	20D		<u>39D</u>	x	2339	179	S	3	x	x	
8			21		0251	69	SL	2-	x	x	
9	x	6	12		0244	56	G	1	x		
9		x	<u>16</u>	15	0449	26	S	1+	x	x	
9	<u>15</u>	10			2146	42	SL	1+	x	x	
10	<u>7D</u>		<u>21</u>		0021	47	SL	2-	x	x	
10	6		<u>9</u>		0116	27	S	1-	x		
10	18D	22D	<u>27</u>		0240	52	SL	2	x	x	
10			<u>7</u>		0333	22	SL	1-		x	
10		15D	<u>35</u>	10D	0403	57	G	3-	x	x	
11	5	10	<u>16</u>		0144E	//	//	1+		x	
11	x	x	<u>12</u>		0217	83	G	1		x	
11	10D	17	<u>26D</u>	20D	0040	60	S	2	x	x	
13	25D	28D	<u>35D</u>	20D	0324	36	S	3-	x	x	
15	18D	18D	<u>40D</u>	10D	0158	92	S	3+	x	x	x
15			<u>15</u>		2146	32	SL	1	x		
17	C	C	<u>33</u>	12D	0145	55	SL	3-	x	x	
17		15	<u>18</u>		2148	13	SL	1+	x	x	
17	10	20D	<u>23</u>	18D	2249	23	SL	2-		x	
18			<u>5</u>	13	0350	20	SL	1-	x	x	
19			<u>17</u>		0041	38	SL	1+	x	x	
19			<u>22</u>		0132	27	SL	2-	x	x	
20			12		0025	19	SL	1	x	x	
20	10D		<u>10</u>	x	0218	22	S	1-	x		
21	8	x	<u>25</u>	10	0211	28	S	2	x		
21		5D	<u>18</u>	17	0459	23	SL	1+	x	x	
21		5	<u>9</u>		2324	46	SL	1-		x	
22	x	x	<u>19</u>		0826	23	SL	1+	x		
25		7	<u>7</u>		0750	9	S	1-	x	x	
26			<u>8</u>		0014	5	S	1-	x	x	
26			<u>15</u>	10	0105	30	SL	1	x	x	
26	x	x	<u>10</u>	14	0150	15	SL	1-	x	x	
29			8		0138	15	S	1-			
29			<u>28</u>	30D	0643	19	S	2+	x	x	
30	x	x	<u>37</u>	10D	0143	47	SL	3		x	
31			<u>10</u>		0018	27	S	1-	x	x	

NOTES CO: Colorado(WWV) HA: Hawaii(WWVH) 1): Australia 2): New zealand

RADIO PROPAGATION  
Sudden Ionospheric Disturbance (SPA)

I N U B O

Dec. 1982	S P A					Time (U.T.)		
	Phase Advance (degrees)					Start	End	Maximum
Date	GBR	$\Omega$ /LR	NWC	$\Omega$ /H	NLK			
1		6	<u>9</u>	4	—	0204	0238	0212
1		24			—	0340	0640	0403
2			6		—	0252	0322	0259
2			4		—	0614	0640	0622
2		<u>32</u>	25		—	0642	0848	0700
2				50	—	2110	2209	2122
2			11*	<u>13*</u>	—	2240	2353	2304
3	28	<u>98</u>	94	74	—	0111	0246	0125
3		<u>10</u>	10	7	—	0312	0414	0332
3		<u>6</u>	6		—	0430	0456	0437
3		<u>15</u>	10		—	0603	0640	0609
3		<u>78</u>	22		—	0900	0954D	0912
3		<u>39</u>			—	0954E	1053	1011
3			—	14	—	2111	2141	2119
3	16	19	—	<u>58</u>	—	2259	0054	2305
4		11	—	<u>8</u>	—	0118	0228	0140
4	17	<u>8</u>	—		—	0424	0500	0434
4		<u>12</u>	13		—	0527	0605	0532
4		<u>13</u>	9		—	0606	0645	0612
4		7			—	0802	0857	0808
4		53			—	0913	1010	0921
4		15			—	1205	1327	1214
4				32	—	2118	2218	2126
4				<u>8</u>	—	2221	2324	2235
5			<u>11</u>	7	—	0027	0112	0035
5		<u>8</u>	16	8	—	0203	0243	0209
5		<u>11</u>	14	7	—	0244	0309D	0250
5		<u>17</u>	18	8	—	0309E	0400	0315
5	24	<u>50</u>	47		—	0423	0526D	0440
5	17	15			—	0526E	0552	0532
5		<u>50</u>	33		—	0612	0748	0628
5	17	<u>50</u>	10		—	0806	0920	0821
5	14	<u>108</u>			—	1001	1149	1008
6	16	<u>28</u>	—	20	—	0152	0322	0220
6		<u>33</u>	—		—	0503	0620	0522
6		<u>127</u>	32		—	0808	0946	0820
6				64	—	2105	2300	2120
6			6	<u>6</u>	—	2327	2352D	2336
6			—	15	—	2352E	0123	0016
7			—	4	—	0124	0154	0131
7	9	<u>29</u>	—	14	—	0208	0304D	0229
7	32	<u>22</u>	—	13	—	0304E	0356D	0331
7		<u>29</u>	—	19	—	0356E	0443D	0359
7		30	6		—	0443E	0537D	0500
7		41			—	0537E	0733	0618

## I N U B O

Dec. 1982	S P A					Time (U.T.)		
	Phase Advance (degrees)					Start	End	Maximum
Date	GBR	$\Omega$ /LR	NWC	$\Omega$ /H	NLK	Start	End	Maximum
7		18			—	0829	0858	0835
7		72			—	0935	1244	1013
7	48	157	<u>209</u>	188	—	2322	0248D	2355
8	66	176	<u>127</u>	80	—	0248E	0556	0313
8		<u>68</u>	34		—	0824	0956	0841
8	17	<u>48</u>			—	1110	1252	1124
8				31	—	1937	2022	1943
9			6	<u>8</u>	—	2359**	0034	0008
9	11		<u>8</u>	6	—	0046	0126	0055
9		<u>68</u>	52	29	—	0235	0416D	0303
9	52	<u>169</u>	88	44	—	0416E	0636D	0453
9		56			—	0636E	0726	0642
9		50			—	0814	0929D	0830
9		78			—	0929E	1027D	0946
9		36			—	1027E	1120	1046
9	33	<u>108</u>			—	1125	1321	1137
9				77	—	2140	2259D	2209
9		19	—	<u>55*</u>	—	2259E	0017D	2324
10	13	81	—	<u>105</u>	—	0017E	0115D	0031
10	12	102	—	<u>85</u>	—	0115E	0156D	0122
10	9	<u>93</u>	—	69	—	0156E	0237D	0207
10	41	<u>216</u>	—	110	—	0237E	0357D	0250
10	62	<u>263</u>	—	106	—	0357E	0746	0429
10	29		—		—	0702	0750	0719
10	30	<u>82</u>	—		—	0758	0945	0810
10		8	—		—	1114	1149	1127
10			—	9	—	2209	2251	2212
10	10		—	4	—	2252	2324	2258
10			—	4	—	2355	0022	0006
11			—	25	—	0031	0140D	0049
11	9	<u>14</u>	—	18	—	0139	0214	0144
11	17	<u>54</u>	—	33	—	0222	0344D	0252
11	13	<u>49*</u>	—	36*	—	0344E	0437D	0408
11	94	<u>267</u>	—	79	—	0437E	0612D	0448
11	12	<u>93</u>	—		—	0612E	0728D	0625
11	16	<u>36</u>	—		—	0728E	0900	0734
11		46	—		—	0948	1137	0953
11				11	—	2108	2139	2113
11				6	—	2206	2254	2216
11			27	<u>21</u>	—	2337	0100	2345
12		<u>12</u>		9	—	0147	0242	0152
12	13	<u>26</u>	24	9	—	0248	0400	0254
12		<u>27</u>	17		—	0640	0755	0648
13	84	<u>283</u>	—	117	—	0322	0446D	0333
13	31	<u>70</u>	—		—	0446E	0702	0458

## I N U B O

Dec. 1982	S P A					Time (U.T.)		
	Phase Advance (degrees)					Start	End	Maximum
Date	GBR	$\Omega$ /LR	NWC	$\Omega$ /H	NLK			
20		27	—	<u>22</u>	—	0101E	0214	0111
20		79	—	<u>37</u>	—	0215	0423	0223
20		19	—		—	0605	0708	0626
20		59	—		—	0711	0810	0719
20		25	—		—	0814	0852	0822
20		40			—	0858	0938	0908
20			12	<u>9</u>	—	2338	0120	2345
21	40	<u>144</u>	—	78	—	0211	0419	0219
21	63	<u>222</u>	130	36	—	0420	0646D	0513
21		<u>84</u>	125		—	0646E	0912	0649
21		12	18	<u>19</u>	—	2310	0047	2338
22	<u>78</u>		5		—	0129	0158	0136
22		13	22	<u>6</u>	—	0205	0252	0222
22		9			—	0314	0408	0329
22		7			—	0509	0554	0514
22		<u>20*</u>	16		—	0632	0745	0712
22		<u>259</u>	131		—	0823	1023	0834
22	16			<u>10</u>	—	2241	2306	2246
23		<u>17</u>	14		—	0511	0630	0516
23	21				—	0714	0744	0721
23		<u>24</u>	14		—	0728	0854	0744
24		11	<u>7</u>	4	—	0126	0159	0133
24		18			—	1014	1135	1021
25		<u>27</u>	28	17	—	0326	0415	0333
25		<u>41</u>	30		—	0446	0608	0521
25	12	<u>96</u>	48		—	0614	0715D	0632
25		<u>289</u>	157		—	0715E	1146	0753
26		29	62	<u>52</u>	—	0013	0120D	0020
26		11	10	<u>8</u>	—	0120E	0146	0127
26		68	<u>69</u>	43	—	0150	0330	0200
26		72			—	0932	1054	0940
27		<u>23</u>	19		—	0525	0656	0531
27				26	—	2020	2050	2024
28		11	9	<u>5</u>	—	0128	0209	0135
28			6		—	0407	0439	0412
28		11			—	0849	0910	0852
28	—	8			—	1206	1228	1212
29		45	—	<u>26</u>	—	0136	0228	0143
29	39	<u>311</u>	—		—	0644	0933	0649
29			8	<u>17</u>	—	2222	2348D	2320
29			21	<u>18</u>	—	2348E	0142	2355
30	40	<u>239</u>	171	146	—	0142	0352	0159
30		<u>8</u>	4		—	0607	0644	0611
30		9			—	0919	0957	0923
30				36	—	2223	2338	2237
31	14	42	<u>80</u>	59	—	0012	0149	0026
31		<u>33</u>	22		—	0512	0649	0524

## I N U B O

Dec. 1982	S P A					Time (U.T.)		
	Phase Advance (degrees)					Start	End	Maximum
Date	GBR	$\Omega$ /LR	NWC	$\Omega$ /H	NLK	Start	End	Maximum
13	32	<u>169</u>	59		—	0802	1014	0812
13				35	—	1953	2036	2004
13				19	—	2106	2203	2123
14		<u>37</u>	51	13	—	0352	0500	0401
14		<u>19</u>	8		—	0628	0720	0642
14		<u>38</u>	27		—	0738	0912	0751
14				7	—	2208	2310	2220
15	135	<u>431</u>	290	233	—	0157	0536	0204
15				84	—	2044	2146D	2052
15				106	—	2146E	0050	2159
16			<u>6</u>	3	—	0058	0128	0105
16		<u>7</u>	8	5	—	0305	0344	0316
16		<u>8</u>	6		—	0544	0621	0600
16		<u>18</u>	12		—	0621	0712	0625
16		104			—	1004	1154	1014
16				31	—	1927	2030	1943
16				6	—	2210	2248	2214
17				5	—	0002	0136	0010
17			<u>13</u>	3	—	0109	0123D	0112
17			<u>5</u>	5	—	0123E	0144D	0132
17	41	<u>165</u>	132	97	—	0144	0348	0155
17	18	<u>75*</u>	91	32	—	0413	0615	0453
17		35			—	0804	0856	0818
17		87			—	1001	1148	1012
17				65	—	1851	1950	1858
17				49	—	2057	2146D	2118
17				59	—	2146E	2244D	2154
17			101	<u>97</u>	—	2244	0155	2258
18		<u>17</u>	13	9	—	0222	0342	0241
18		<u>85</u>	—	32	—	0348	0526	0358
18		47	—		—	0602	0800	0622
18		212			—	0821	0953	0827
18		63			—	0953	1046	1000
18				9	—	2248	2349	2252
18				10	—	2349	0032D	0004
19		49	<u>80*</u>	52*	—	0032	0134D	0058
19		138	<u>131</u>	84	—	0134E	0228D	0142
19		37	<u>67</u>	39	—	0228E	0420	0236
19		5	<u>4</u>		—	0452	0526	0456
19		<u>16</u>	9		—	0622	0755	0630
19		19			—	0817	0900	0834
19		<u>47</u>	10		—	0904	0947	0913
19		17			—	0950	1017	0953
19			9	<u>18</u>	—	2228	0007	2236
20		36	—	<u>51</u>	—	0011	0101D	0026



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