F − 300

IONOSPHERIC DATA IN JAPAN

FOR DECEMBER 1973

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CONTENTS

RADIO RESEARCH LABORATORIES
MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

OBSERVATION STATIONS

Ionospheric observations are carried out by means of the ionospheric vertical sounding at the following five observatories in Japan.

	Latitude	Longitude	Site
Wakkanai	45°23.6′N	141°41.1′E	Midori, Wakkanai-shi, Hokkaido
Akita	39°43.5′N	140°08.2′E	Tegata-Sumiyoshi-cho, Akita-shi, Akita-ken
Kokubunji	35°42.4′N	139°29.3′E	Nukui-Kitamachi, Koganei-shi, Tokyo
Yamagawa	31°12.1′N	130°37.1′E	Yamagawa-machi, Ibusuki-gun, Kagoshima-ken
Okinawa	26°19.0′N	127°46.8′E	Chatan-son, Nakagami-gun, Okinawa-ken

Solar radio emission and radio propagation conditions are observed at Hiraiso Branch and Inubo Radio Wave Observatory.

	Latitude	Longitude	Site
Hiraiso	36°22.0′N	140°37.5′E	Isozaki-machi, Nakaminato-shi, Ibaraki-ken
Inubo	35°42.2′N	140°51.5′E.	Tennodai, Choshi-shi, Chiba-ken

SYMBOLS AND TERMINOLOGY

A. IONOSPHERE

All symbols and terminology in the table of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction," 1961.

a. Terminology

f_oF2, f_oF1, f_oE — The ordinary wave critical frequency for the $F2$, $F1$ and E layers, respectively.

f_oE_s — The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.

f_bEs — The lowest ordinary wave frequency at which the Es layer begins to become transparent. This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.

f-min — The frequency below which no echoes are observed.

M(3000)$F2$ — The maximum usable frequency factor for a path of 3000 km for transmission by $F2$ layer.

M(3000)$F1$ — The maximum usable frequency factor for a path of 3000 km for transmission by $F1$ *layer.*

$h'F2$ — The minimum virtual height, $h'F2$, refers to the highest, most stable stratification observed in the F region and can only be scaled when such stratification is present.

$h'F$ — The natural and most significant F region virtual height parameter is that for lowest F region stratification. This will be denoted by $h'F$. Thus $h'F$ is identical with the current $h'F2$ when F region stratification is absent, e.g., at night, and with the current $h'F1$ when $F1$ stratification is present.

$h'Es$ — The lowest virtual height of the trace used to give the $foEs$.

$hpF2$ — The virtual height of the $F2$ layer measured on the ordinary wave component at a frequency equal to 0.834 $foF2$.

$ypF2$ — The semi-thickness of the $F2$ layer deduced from a parabolic fit to the

"nose" of the electron density distribution with height and based on the observed $h'f$ trace. (The difference between $hpF2$ and the virtual height at 0.969 $foF2$).

b. Descriptive Letters

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

A	Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example *Es*.
B	Measurement influenced by, or impossible because of, absorption in the vicinity of f-min.
C	Measurement influenced by, or impossible because of, any nonionospheric reason.
D	Measurement influenced by, or impossible because of, the upper limit of the normal frequency range. Used in a qualifying sense, see below.
E	Measurement influenced by, or impossible because of, the lower limit of the normal frequency range. Used in a qualifying sense, see below.
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.
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.
R	Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
S	Measurement influenced by, or impossible because of, interference or atmospherics.
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
V	Forked trace which may influence the measurement.
W	Measurement influenced or impossible because the echo lies outside the height range recorded.
X	Measurement refers to the extraordinary component.
Y	Intermittent trace.
Z	Third magneto-ionic component present.

c. Qualifying Letters

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

D	Greater than.
E	Less than.
I	Missing value has been replaced by an interpolated value.
J	Ordinary component characteristic deduced from the extraordinary component.

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-ionic component.

d. 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.

e. Description of Standard Types of *Es*

The eight standard types of *Es* are identified by corresponding capital letters: *F, L, C, H, Q, R, A, S.* These letters suggest the names flat, low, cusp, high, equatorial, retardation, auroral and slant, respectively. The letter '*N*' is used to designate any *Es* trace that does not correspond to any of the eight types.

F — An *Es* trace which shows no appreciable increase of height with frequency. The trace is usually relatively solid at most latitudes. This classification may only be used at night; apparently flat *Es* traces observed in the daytime are classified according to their virtual hight: *H* or *L.*

L — A flat *Es* trace at or below the normal *E* layer minimum virtual height in the day or below the night *E* layer minimum virtual height at night.

C — An *Es* trace showing a relatively symmetrical cusp at or below $f_o E$. This is usually continuous with the normal *E* trace, although when the deviative absorption is large, part or all of the cusp may be missing. (Usually a daytime type.)

H — An *Es* 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 *Es* trace lying clearly above the high frequency end of the normal *E* trace. (Usually a daytime type.)

Q — An *Es* trace which is diffuse and non-blanketing over a wide frequency range. The spread is most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)

R — An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation but which is non-blanketing over part or all of its frequency range. This is distinguished from the usual group retardation (as in the case of an occulting thick *E* layer) by the lack of group retardation in the *F* layer traces at corresponding frequencies and the lack of complete blanketing.

A — An *Es* having a well defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. These sometimes extend over several hundred kilometers of virtual height.

S — A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace. The rising trace alone is classified as 'S'; the horizontal trace is classified separately. At high latitudes the slant

trace usually starts to rise from a horizontal *Es* trace such as *Es-L*, or *Es-F*, at frequencies which greatly exceed the *E* layer critical frequency, whereas at low latitudes it usually rises from *Es-Q*, *Es C* or *Es-H* at frequencies near the regular *E* critical frequency. Type *S* is never used to determine f_0Es and *h'Es*. The slant trace is sometimes observed to start at f_0E without echoes clearly identifiable as *Es* echoes being seen.

N The designation 'N' is used to denote an *Es* trace which cannot be classified into one of the standard types. When a trace appears to be intermediate between any two classes a choice should be made whenever possible even if it is uncertain. 'N' should be used sparingly.

f. Multiple Reflections from *Es*

When the ionogram shows the presence of multiple reflections from *Es* the number of traces seen should be recorded after the letter indicating the type.

B. SOLAR RADIO EMISSION

Solar radio observations are carried out on 100, 200 and 500 MHz at Hiraiso. Observation equipments are: a 5 meter parabolic reflector with a total-power receiver for 500 MH_2 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} W m^{-2} Hz^{-1} for both components of polarization.

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

b. Distinctive Events

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.

Starting time and *Time of maximum* are given to the nearest minute in general, but to nearest a tenth minute for short intense occurrences of clear commencements. *Date* indicates the day to which *starting time* of event belongs.

Duration is given in minutes and to nearest a tenth minute, if short or clear.

Type is denoted by the following descriptive symbols.

S : simple rise and fall of intensity,
C : complex variation of intensity,
C+ : prolonged broad-band enhancement of radiation, generally of spectral type IV,

F : group of bursts, multiple peaks probably belonging to the same event, but separated by relatively short period of quietness,

RF : more or less irregular rise and fall of intensity, at metric or decimetric wavelength,

e : sudden beginning of burst with steep rise of intensity,

E : steep rise of intensity of continuum background,

pi : post-burst increase,

ns : noise storm.

Peak intensity is the flux density of each important peak of the occurrence, measured above the pre-burst level.

Mean intensity is the flux density averaged over the duration of burst, measured above the pre-burst level.

Polarization is expressed by polarization degree as follows:

O : no apparent polarization,

r or l : right- or left-handed polarization degree less than 0.5,

R or L : right- or left-handed polarization degree equal to or less than 1,

s : oscillatory change of polarization degree less than 0.5,

S : oscillatory change of polarization degree equal to or less than 1.

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

D : greater than,

E : less than,

U : uncertain or doubtful, also including a case of partial interruption of observed phenomenon.

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 Hiraiso. 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 tables.

Characteristics	Transmitter		Receiver
Station Call	WWV	WWVH	
Location	Fort Collins, Colorado	Kauai, Hawaii	Hiraiso, Ibaraki
latitude	40°41′N	22°00′N	36°22′N
longitude	105°02′W	159°46′W	140°38′E
Distance	9150 km	5910 km	–
Carrier Power	10 kW	10 kW	–
Modulation	50%	50%	–
Antenna	λ/2 vertical	λ/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 values from which a median has been computed,
MED : median,
UD : upper decile, median of the uppermost fifth of values when they are ranked according to magnitude,
LD : lower decile, median of the lowest fifth of values when they are ranked according to magnitude,
U : uncertain,
E : less than,
C : influenced by, or impossible because of, any non-propagational reasons,
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, respectively. *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_0, 1+, 2–, 2_0, 2+ 3–, 3_0, 3+, 4–, 4_0, 4+, 5–, 5_0 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 twice 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* is expressed in hours and minutes U.T. (or tenths of hour), and *range* in gammas. 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 distinguished by marks ', '' and ''' from these of the 15 MHz wave for WWV and WWVH, respectively. Values of *start, duration, type* and *importance* are obtained from data of the circuit whose drop-out intensity in dB is underlined as___. When these quantities are not given correctly, they are accompanied by the following symbols.

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

Types of fade-out are as follows

S : sudden drop-out and gradual recovery,

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

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

Correspondence of solar flare, solar radio burst or geomagnetic crochet 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 wave propagation received at Inubo. Characteristics of the VLF radio wave propagation circuits are given on the following table. In the last coloumn, distance of circuit along the great circle is shown.

Transmitter					Distance of circuit (km)
Name	Location (Geographic Coordinate)	Station Call	Frequency (kHz)	Radiation Power (kW)	
Rugby	52°22′N 001°11′W	GBR	16.0	40	9550
Fort Collins	40°41′N 105°03′W	WWVL	20.0	1.8	9190
Cutler	44°39′N 067°17′W	NAA	17.8	1000	10640
North West Cape	21°49′S 114°10′E	NWC	22.3	1000	6990
Lualualei	21°26′N 158°09′W	NPM	23.4	300	6070
Jim Creek	48°12′N 121°55′W	NPG	18.6	250	7620
Haiku	21°24′N 157°50′W	HA0 HA2 HA3	10.2 12.2 13.6	10	6100
Aldra	66°25′N 013°09′E	AL0 AL2 AL3	10.2 12.3 13.6	10	7820
North Dakota	46°22′N 098°20′W	ND0 ND2 ND3	10.2 12.85 13.6	10	9150

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 the column *remarks,* the event with its corresponding solar X-ray data observed by satellites is shown by X.

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.

IONOSPHERIC DATA

DEC. 1973 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' 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	S	F 31	F 30	30	29	25	S	54	68	63	76	78	68	68	61	58	45	36	31	36	A	33	S	S 39
2	U S 38	F	F	35	34	39	39	50	60	64	68	71	64	66	61	65	48	36	35	29	27	23	28	S 32
3	33	31	30	29	28	26	27	45	62	58	78	72	60	63	56	47	47	26	26	30	33	S 33	S 24	S
4	S	27	30	30	30	30	S 30	47	S	72	68	70	67	59	54	60	57	37	33	S	38	35	31	33
5	29	A	S	28	28	34	U S 25	S 41	57	I R 90	R 113	R	75	C	C	C	57	34	41	A	S	S 30	S 38	S
6	S	F	U F 43	F 43	F	47	S	S	55	63	83	83	70	59	64	57	56	35	32	37	36	S	S	S
7	S	F 31	F 30	30	28	24	S	40	50	56	71	63	65	54	58	47	50	A	26	28	A	34	30	U S 30
8	32	S 30	F 27	F 28	F 32	29	19	S	57	57	60	76	60	57	55	53	50	A	A	A	F	F 27	F 30	F
9	S 36	F	F	F	F	F	S	50	66	54	69	60	77	62	55	52	41	25	37	33	33	35	U S 33	S
10	U S 33	U S 35	33	33	30	28	30	S 45	65	75	74	70	68	56	58	54	38	27	A	A	33	S 35	30	F 33
11	F 36	F 37	40	F	F	F	U S 41	S 43	56	58	H 56	67	58	67	60	49	33	A	30	33	30	30	30	31
12	A	F 30	32	30	F 27	27	30	38	49	50	70	75	60	59	63	53	39	25	30	26	33	35	37	36
13	37	35	F 37	F	F 31	F	F	U S 55	58	60	59	63	58	61	57	57	36	27	28	24	S 28	30	30	U F 30
14	U F 33	F 33	F 31	F 30	F 30	26	24	38	51	51	62	H 68	59	66	53	50	38	H 27	24	28	33	S 30	F 30	F
15	F	F	F	F	F	F	F 23	U S 40	50	60	67	75	61	57	H 52	68	38	29	28	29	33	36	31	34
16	30	34	35	S 36	33	28	25	43	57	50	66	66	58	C	54	59	40	33	29	26	31	27	29	31
17	S 27	30	S 32	S 33	F 28	F 28	23	S 40	51	56	67	65	60	54	56	60	49	30	27	25	26	S 32	24	28
18	29	31	31	30	28	30	21	40	56	56	53	65	H 63	63	H 56	53	U S 45	37	30	28	28	26	F 28	F 36
19	F	F	U F 35	F 35	F	F 28	F 28	38	48	I C 50	57	63	53	63	52	54	44	35	28	S	27	33	26	29
20	31	30	30	27	F 27	30	24	45	54	63	62	73	83	68	71	62	A	48	30	A	30	33	30	34
21	36	35	36	38	U S 40	S	F 23	S	52	68	H 73	74	88	71	66	54	48	48	43	36	27	28	30	30
22	30	27	U S 27	30	33	22	S	S	61	69	65	75	69	65	64	57	H 42	40	29	29	30	26	S 30	32
23	32	37	S	40	S 33	23	20	38	57	63	67	68	69	68	65	60	43	28	23	29	28	29	27	30
24	29	28	30	30	28	28	23	40	52	59	64	73	63	62	58	51	40	31	25	27	30	25	S 29	U S 28
25	F 33	F	F 33	F	F	F 25	F 28	41	51	53	60	73	A	66	65	63	38	28	31	26	24	24	25	25
26	S 25	27	F 30	U F 28	F 31	U F 31	F 20	37	47	54	62	58	73	50	60	58	41	S	28	30	24	18	F	F
27	F 24	27	28	26	23	25	23	34	48	58	67	63	68	57	60	53	40	22	25	20	23	23	23	26
28	26	26	27	28	26	29	25	S 33	51	50	63	67	59	55	60	55	40	20	27	25	25	A	28	S
29	S	F	F 28	F 30	F 30	30	26	37	47	56	H 60	66	68	55	56	68	57	33	27	25	28	24	25	S 28
30	27	27	29	29	28	29	A	33	53	58	65	63	67	79	65	50	45	31	27	30	33	26	26	30
31	31	32	29	30	28	26	26	32	46	61	71	64	64	59	65	51	52	31	A	27	32	A	28	30
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	23	26	26	25	26	24	27	30	31	31	30	30	29	30	30	30	27	28	25	27	28	28	23
MED	31	31	30	30	29	28	25	40	54	58	67	68	64	62	59	54	44	31	28	28	30	30	30	30
UQ	33	34	33	33	31	30	28	45	57	63	70	73	69	66	64	60	49	36	31	30	33	33	30	33
LQ	29	28	29	29	28	26	23	38	50	55	62	64	60	57	56	52	40	27	27	26	27	26	26	30

The Radio Research Laboratories, Japan

DEC. 1973 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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												A	A	A	C									
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26																								
27												380	380											
28																								
29																								
30																								
31														340										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												1	1	1										
MED												380	380	340										
UQ																								
LQ																								

The Radio Research Laboratories, Japan

DEC. 1973 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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	205	A	A	290	280	270	235	200	S							
2								S	200	245	275	280	290	270	230	190	S							
3								S	205	250	270	280	285	270	235	200	S							
4								S	210	255	270	270	265	255	235	190	S							
5								S	200	230	A	A	A	C	C	C	S							
6								S	200	220	250	265	260	A	220	170	S							
7								S	195	S	250	260	260	250	230	A	S							
8								S	205	230	240	265	A	255	A	A	S							
9								S	190	S	240	I A 265	265	265	230	A	S							
10								S	185	230	255	265	A	235	A	S	S							
11								S	A	A	250	265	265	255	210	S	S							
12								S	A	230	B	B	B	250	B	B	S							
13								A	S	235	255	270	B	255	225	B	S							
14								S	A	230	270	275	265	260	230	A	S							
15								S	190	235	260	265	265	265	220	185	S							
16								S	180	235	260	275	260	C	235	S	S							
17								S	A	250	275	280	280	255	230	S	S							
18								S	190	235	270	270	280	260	225	190	S							
19								S	205	I C 260	275	285	A	A	A	A	A							
20								S	205	250	265	270	275	260	A	S	S							
21								S	A	245	270	285	290	250	A	A	E							
22								S	A	235	265	270	A	A	A	A	A							
23								S	190	235	250	265	260	260	230	A	S							
24								S	S	215	250	270	275	265	230	190	S							
25								S	200	240	270	A	280	A	A	A	S							
26								S	170	225	270	290	A	A	A	200	S							
27								S	170	230	A	A	280	270	240	195	S							
28								S	205	245	265	275	I A 280	270	230	185	S							
29								S	205	225	255	275	275	270	240	A	S							
30								S	180	215	240	270	265	250	220	190	S							
31								S	S	A	A	270	A	A	235	170	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									22	26	26	27	22	23	21	13	1							
MED									200	235	262	270	275	260	230	190	E							
UQ									205	245	270	278	280	268	235	195								
LQ									190	230	250	265	265	255	225	185								

The Radio Research Laboratories, Japan

DEC. 1973 | FOE (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E S 16	E S 14	E	E S 13	E S 14	E S 15	E S 17	E S 16	G	J X 42	J X 35	G	G	G	G	G	E S 14	20	E S 15	E S 16	J X 53	29	E S 15	E S 16
2	E S 16	E	E S 14	E	E	25	E S 15	E S 16	G	G	32	G	37	G	30	25	E S 13	E S 15	E S 15	E S 16	E S 15	E S 16	E S 15	E S 16
3	J X 23	25	E S 14	E S 13	E S 14	E S 14	E S 15	28	G	31	G	G	G	G	G	23	22	E S 16	E S 14	23	E S 15	E S 15	E S 16	E S 17
4	S	E	E S 14	20	E	E S 15	E S 18	E S 16	G	G	G	G	G	G	G	G	E S 13	E S 15	E S 16	E S 17	E S 14	E S 15	E S 14	E S 15
5	E S 17	33	J X 40	28	E S 15	E S 14	E	26	J X 53	30	J X 73	J X 40	J X 60	C	C	C	E S 13	28	J X 43	J X 43	24	E S 15	E S 15	E S 16
6	E S 16	E	E S 14	E S 15	E S 14	E S 16	E S 15	E S 17	26	39	G	G	G	27	G 20	21	E S 15	30	J X 21	E S 16	E S 16	S	E S 16	S
7	S	30	23	20	E S 14	E S 13	E S 17	E S 16	G	E S 48	G	G	G	G	G	J X 33	J X 41	38	E S 15	27	J X 71	J X 43	E S 17	E S 16
8	E S 16	E S 15	26	E	E S 15	E S 14	E S 15	E S 15	24	G	32	28	J X 60	G	J X 36	35	20	34	50	J X 42	25	J X 53	24	E S 15
9	E S 15	E S 15	E S 13	E S 14	E S 13	E S 15	E S 14	18	22	30	G	32	G 23	G 24	G	20	E S 14	E S 16	E S 16	24	E S 15	E S 16	E S 15	E S 16
10	E S 15	E S 13	E	23	20	E S 15	E S 14	19	J X 33	32	J X 40	G	J X 33	G	28	J X 35	30	E S 14	J X 75	J X 50	J X 35	E S 16	24	23
11	28	E S 13	E S 15	21	J X 23	J X 28	26	E S 15	J X 51	J X 48	G	G	G	G	G	21	J X 43	38	31	J X 32	25	25	E S 15	E S 15
12	35	31	24	E S 15	E S 15	26	34	28	28	G	E B 28	E B 28	E B 28	G	E B 28	E B 20	E S 15	E S 15	E S 17	26	E S 15	E S 15	E S 16	23
13	E S 14	E S 14	E S 15	26	E	E S 15	E S 15	28	E S 20	G	G	G	E B 30	G	G	E B 20	E S 15	30	E S 16	E S 15	E S 15	E S 15	28	E S 15
14	E S 15	E S 15	24	E	27	E S 15	E S 15	E S 15	22	G	G	G	G	G	G	20	E S 15	E S 15	E S 15	E S 16	E S 16	J X 26	E S 16	E S 15
15	E S 15	E S 15	E	24	24	24	E S 15	E S 17	G	31	G	G	G	G	G	G	E S 14	E S 15	E S 16	E S 15	E S 16	E S 15	E S 15	E S 15
16	E S 17	29	E S 15	24	E S 15	E S 17	E S 15	E S 16	23	G	G	G	G	C	G	E S 20	17	27	J X 51	E S 15	E S 17	E S 15	E S 15	E S 15
17	E S 14	E S 14	E S 15	E	E	E S 16	E S 15	E S 15	21	G	G	G	G	G	G	21	E S 14	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16
18	E S 15	E S 14	E S 15	E S 14	E S 15	E S 15	E S 16	E S 15	24	G	31	G	G	30	J X 50	30	J X 84	J X 91	32	E S 15	E S 15	E S 15	E S 16	E S 15
19	E S 15	30	28	26	E S 15	22	E S 16	E S 15	G	C	32	G	34	38	J X 38	J X 30	J X 35	J X 51	J X 53	J X 25	E S 15	E S 15	E S 15	E S 15
20	E S 15	26	23	24	E S 15	E S 14	E S 15	E S 14	G	G	G	34	J X 57	40	48	24	J X 53	J X 34	41	J X 33	28	33	E S 16	E S 16
21	E S 16	27	63	J X 33	34	35	25	E S 15	28	31	39	33	34	G 20	34	21	18	E S 14	E S 15	23	25	30	26	E S 15
22	E S 16	24	26	E S 15	E S 15	E S 15	S	S	28	G	31	33	30	33	27	J X 33	J X 35	31	29	E S 16	E S 17	29	26	30
23	28	25	J X 25	J X 33	J X 25	32	23	E S 15	G	G	G	G	G	30	J X 43	24	E S 15	27	41	E S 15	J X 23	E S 15	E S 15	E S 16
24	E S 16	E S 14	E S 15	E S 15	E	E S 16	E S 16	E S 15	G	G	36	G	G	G	28	28	E S 15	26	E S 15	E S 16	29	24	E S 14	E S 15
25	E S 15	E S 15	E S 15	J X 24	31	E S 15	E S 15	E S 15	G	G	G	33	J X 83	J X 123	J X 40	J X 46	E S 16	E S 15	E S 16	E S 14	E S 16	E S 16	E S 15	E S 15
26	E S 15	E S 14	E S 16	25	28	21	E S 15	E S 15	G	26	G	38	J X 50	33	J X 68	G	J X 23	S	E S 16	E S 15	E S 16	E S 15	E S 15	E S 16
27	E S 15	E S 15	23	22	E S 15	E S 14	E S 17	E S 15	G	31	33	28	G	G	G	G	E S 15	J X 24	E S 16	25	20	E S 15	20	E S 15
28	E S 16	21	E S 15	E S 13	17	E S 15	E S 14	E S 15	25	G	G	33	30	G	G	21	E S 17	E S 15	E S 16	E S 15	E S 16	J X 50	32	27
29	25	E S 14	30	E S 14	E	E S 15	E S 15	E S 15	G	G	30	33	33	G	G	23	J X 55	J X 30	28	34	E S 16	E S 15	E S 15	E S 15
30	E S 14	20	26	E S 13	E S 15	23	J X 51	E S 15	G	28	30	35	G	38	27	G	E S 14	E S 15	E S 15	E S 17	E S 17	26	24	E
31	E S 15	E S 15	E S 15	23	E	E S 14	E S 15	E S 15	25	J X 33	J X 50	G	37	34	G	20	E S 16	E S 15	J X 60	27	30	32	32	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	29	31	31	31	31	31	30	30	31	30	31	31	31	29	30	30	31	30	31	31	31	30	31	30
MED	E S 16	E S 15	E E 15	20	15	E S 15	E S 15	E S 15	20	G	G	G	E G 23	G	E G 20	21	E S 16	22	E S 16	E S 17	E S 16	E S 16	E S 16	E S 16
UQ	E S 16	25	24	24	18	22	E S 17	E S 17	25	31	32	33	34	30	34	28	26	30	36	26	25	29	22	E S 16
LQ	E S 15	E S 14	E S 14	E S 14	E S 14	E S 15	E S 15	E S 15	G	G	G	G	G	G	G	20	E S 14	E S 15	E S 15	E S 16	E S 16	E S 15	E S 15	E S 15

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

DEC. 1973 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' 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	E S 16	E S 14	E	E S 13	E S 14	E S 15	E S 17	E S 16	G	32	27	G	G	G	G	G	E S 14	E	E S 15	E S 16	A	E	E S 15	E S 16
2	E S 16	E	E S 14	E	E	E	E S 15	E S 16	G	G	G	G	G	G	G	G	E S 13	E S 15	E S 15	E S 16	E S 15	E S 16	E S 15	E S 16
3	E	E	E S 14	E S 13	E S 14	E S 14	E S 15	19	G	G	G	G	G	G	G	G	17	E S 16	E S 14	E	E S 15	E S 15	E S 16	E S 17
4	S	E	E S 14	E	E	E S 15	E S 18	E S 16	G	G	G	G	G	G	G	G	E S 13	E S 15	E S 16	E S 17	E S 14	E S 15	E S 14	E S 15
5	E S 17	A	20	18	E S 15	E S 14	E	26	50	G	68	37	59	C	C	C	E S 13	E	19	A	E	E S 15	E S 15	E S 16
6	E S 16	E	E S 14	E S 15	E S 14	E S 16	E S 15	E S 17	G	G	G	G	G	25	G 19	21	E S 15	20	19	E S 16	E S 16	S	E S 16	S
7	S	20	E	E	E S 14	E S 13	E S 17	E S 16	G	E S 48	G	G	G	G	G	25	37	A	E S 15	20	A	20	E S 17	E S 16
8	E S 16	E S 15	E	E	E S 15	E S 14	E S 15	E S 15	G	G	G	22	32	G	30	23	16	A	A	A	E	E	E	E S 15
9	E S 15	E S 15	E S 13	E S 14	E S 13	E S 15	E S 14	G	G	G	G	28	G 20	G 20	G	20	E S 14	E S 16	E S 16	E	E S 15	E S 16	E S 15	E S 16
10	E S 15	E S 13	E	E	E	E S 15	E S 14	G	30	G	18	G	29	G	23	30	G	E S 14	A	A	E	E S 16	E	E
11	E	E S 13	E S 15	E	E	20	E	E S 15	21	27	G	G	G	G	G	G	20	A	E	20	E	E	E S 15	E S 15
12	A	20	17	E S 15	E S 15	20	20	16	21	G	E B 28	E B 28	E B 28	G	E B 28	E B 20	E S 15	E S 15	E S 17	E	E S 15	E S 15	E S 16	E
13	E S 14	E S 14	E S 15	E	E	E S 15	E S 15	17	E S 20	G	G	G	E B 30	G	G	E B 20	E S 15	E	E S 16	E S 15	E S 15	E S 15	E	E S 15
14	E S 15	E S 15	E	E	E	E S 15	E S 15	E S 15	21	G	G	G	G	G	G	20	E S 15	E S 15	E S 15	E S 16	E S 16	E	E S 16	E S 15
15	E S 15	E S 15	E	E	E	E	E S 15	E S 17	G	G	G	G	G	G	G	G	E S 14	E S 15	E S 16	E S 15	E S 16	E S 15	E S 15	E S 15
16	E S 17	E	E S 15	E	E S 15	E S 17	E S 15	E S 16	G	G	G	G	G	C	G	E S 20	G	E	20	E S 15	E S 17	E S 15	E S 15	E S 15
17	E S 14	E S 14	E S 15	E	E	E S 16	E S 15	E S 15	21	G	G	G	G	G	G	G	E S 14	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16
18	E S 15	E S 14	E S 15	E S 14	E S 15	E S 15	E S 16	E S 15	G	G	G	G	G	G	50	G	20	20	E	E S 15	E S 15	E S 15	E S 16	E S 15
19	E S 15	E	E	E	E S 15	E	E S 16	E S 15	G	C	G	G	32	27	25	23	24	20	17	E	E S 15	E S 15	E S 15	E S 15
20	E S 15	E	E	E	E S 15	E S 14	E S 15	E S 14	G	G	G	G	G	G	37	21	A	20	20	A	20	18	E S 16	E S 16
21	E S 16	E	20	E	E	E	E	E S 15	23	G	G	G	G	G 19	27	18	G	E S 14	E S 15	E	E	E	E	E S 15
22	E S 16	15	E	E S 15	E S 15	E S 15	S	S	21	G	G	G	28	28	22	21	15	E	E	E S 16	E S 17	E	E	18
23	E	E	17	E	E	E	E	E S 15	G	G	G	G	G	G	39	23	E S 15	E	E	E S 15	E	E S 15	E S 15	E S 16
24	E S 16	E S 14	E S 15	E S 15	E	E S 16	E S 16	E S 15	G	G	20	G	G	G	G	G	E S 15	E	E S 15	E S 16	20	E	E S 14	E S 15
25	E S 15	E S 15	E S 15	E	E	E S 15	E S 15	E S 15	G	G	G	29	A	26	28	41	E S 16	E S 15	E S 16	E S 14	E S 16	E S 16	E S 15	E S 15
26	E S 15	E S 14	E S 16	E	E	E	E S 15	E S 15	G	G	G	G	30	30	40	G	G	S	E S 16	E S 15	E S 16	E S 15	E S 15	E S 16
27	E S 15	E S 15	E	E	E S 15	E S 14	E S 17	E S 15	G	G	31	28	G	G	G	G	E S 15	E	E S 16	E	E	E S 15	E	E S 15
28	E S 16	E	E S 15	E S 13	15	E S 15	E S 14	E S 15	G	G	G	G	27	G	G	G	E S 17	E S 15	E S 16	E S 15	E S 16	A	16	E
29	E	E S 14	E	E S 14	E	E S 15	E S 15	E S 15	G	G	G	G	G	G	G	18	36	E	E	E	E S 16	E S 15	E S 15	E S 15
30	E S 14	E	E	E S 13	E S 15	E	A	E S 15	G	G	G	G	G	G	G	G	E S 14	E S 15	E S 15	E S 17	E S 17	E	E	E
31	E S 15	E S 15	E S 15	E	E	E S 14	E S 15	E S 15	G	26	35	G	28	25	G	G	E S 16	E S 15	A	E	21	A	20	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	29	31	31	31	31	31	30	30	31	30	31	31	31	29	30	30	31	30	31	31	31	30	31	30
MED	E S 15	E S 14	E E 14	E	E E 13	E S 15	E S 15	E S 15	G	G	G	G	G	G	G	E G 18	E S 15	E E 15	E S 16	E S 15	E S 16	E S 15	E S 15	E S 15
UQ	E S 16	E S 15	E S 15	E S 14	E S 15	E S 15	E S 16	E S 16	20	G	G	G	28	G 19	26	21	16	E S 16	17	E S 16	E S 16	E S 16	E S 16	E S 16
LQ	E S 15	E	E	E	E	E S 14	E S 15	E S 15	G	G	G	G	G	G	G	G	E S 14	E	E S 15	E E 14	E S 14	E	E S 14	E S 15

The Radio Research Laboratories, Japan

DEC. 1973 | FBES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | F-MIN (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45 23.6 N. Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 14	E	E S 13	E S 14	E S 15	E S 17	E S 16	14	11	11	14	15	11	12	15	E S 14	E S 15	E S 15	E S 16	E S 15	E S 16	E S 15	E S 16
2	E S 16	E	E S 14	E	E	E S 14	E S 15	E S 16	14	15	11	16	11	16	12	11	E S 13	E S 15	E S 15	E S 16	E S 15	E S 16	E S 15	E S 16
3	E S 15	E S 15	E S 14	E S 13	E S 14	E S 14	E S 15	E S 14	16	11	11	11	11	11	13	13	E S 13	E S 16	E S 14	E S 15	E S 15	E S 15	E S 16	E S 17
4	S	E	E S 14	E S 15	E	E S 15	E S 18	E S 16	15	17	19	18	20	20	17	15	E S 13	E S 15	E S 16	E S 17	E S 14	E S 15	E S 14	E S 15
5	E S 17	E S 15	E S 14	E S 14	E S 15	E S 14	E	E S 15	13	19	21	20	16	C	C	C	E S 13	E S 15	E S 16	E S 15	E S 16	E S 15	E S 15	E S 16
6	E S 16	E	E S 14	E S 15	E S 14	E S 16	E S 15	E S 17	16	18	14	13	13	11	11	E	E S 15	E S 16	E	E S 16	E S 16	S	E S 16	S
7	S	E S 15	E S 14	E S 13	E S 14	E S 13	E S 17	E S 16	15	E S 48	15	15	14	15	13	15	E S 15	E S 16	E S 15	E S 15	E S 15	E S 15	E S 17	E S 16
8	E S 16	E S 15	E S 15	E	E S 15	E S 14	E S 15	E S 15	16	15	15	15	16	16	16	15	E S 15	E S 14	E S 15	E S 16	E S 15	E S 15	E S 16	E S 15
9	E S 15	E S 15	E S 13	E S 14	E S 13	E S 15	E S 14	E S 15	15	E S 21	16	16	15	15	17	E S 15	E S 14	E S 16	E S 16	E S 16	E S 15	E S 16	E S 15	E S 16
10	E S 15	E S 13	E	E S 13	E S 15	E S 15	E S 14	E S 15	15	15	15	15	15	15	15	E S 16	E S 16	E S 14	E S 14	E S 12	E S 15	E S 16	E S 15	E S 15
11	E S 14	E S 13	E S 15	E	E S 14	E S 15	E S 15	E S 15	15	15	15	16	18	18	16	E S 16	E S 15	E S 15	E S 16	E S 16	E S 16	E S 15	E S 15	E S 15
12	E S 15	E S 15	E S 14	E S 15	E S 15	E S 14	E S 15	E S 14	15	20	28	28	28	20	28	20	E S 15	E S 15	E S 17	E S 14	E S 15	E S 15	E S 16	E S 15
13	E S 14	E S 14	E S 15	E	E	E S 15	E S 15	E	E S 20	20	20	22	30	20	18	20	E S 15	E S 15	E S 16	E S 15	E S 15	E S 15	E S 16	E S 15
14	E S 15	E S 15	E S 15	E	E S 14	E S 15	E S 15	E S 15	15	16	15	17	17	20	20	15	E S 15	E S 15	E S 15	E S 16	E S 16	E S 15	E S 16	E S 15
15	E S 15	E S 15	E	E S 14	E S 14	E S 15	E S 15	E S 17	15	16	20	20	20	20	16	16	E S 14	E S 15	E S 16	E S 15	E S 16	E S 15	E S 15	E S 15
16	E S 17	E S 15	E S 15	E S 14	E S 15	E S 17	E S 15	E S 16	16	17	16	20	20	C	20	E S 20	E S 12	E S 16	E S 15	E S 15	E S 17	E S 15	E S 15	E S 15
17	E S 14	E S 14	E S 15	E	E	E S 16	E S 15	E S 15	15	15	15	15	15	15	15	E S 17	E S 14	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16
18	E S 15	E S 14	E S 15	E S 14	E S 15	E S 15	E S 16	E S 15	15	12	11	12	13	11	14	15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15
19	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15	E S 16	E S 15	15	C	15	15	15	20	14	E	E	E S 16	E S 14	E S 15	E S 15	E S 15	E S 15	E S 15
20	E S 15	E S 14	E S 15	E S 15	E S 15	E S 14	E S 15	E S 14	14	15	13	13	12	15	14	E S 15	E S 15	E	E S 17	E	E S 16	E S 16	E S 16	E S 16
21	E S 16	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15	E S 15	13	11	11	15	11	11	11	11	E	E S 14	E S 15	E S 16	E S 16	E S 15	E S 16	E S 15
22	E S 16	E	E S 16	E S 15	E S 15	E S 15	S	S	15	11	11	15	14	12	11	11	E	E S 15	E S 14	E S 16	E S 17	E S 16	E S 15	E S 15
23	E S 16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 17	E S 15	15	14	16	20	20	16	15	14	E S 15	E S 15	E S 17	E S 15	E S 15	E S 15	E S 15	E S 16
24	E S 16	E S 14	E S 15	E S 15	E	E S 16	E S 16	E S 15	E S 16	15	14	13	16	14	14	11	E S 15	E S 16	E S 15	E S 16	E S 16	E S 15	E S 14	E S 15
25	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15	E S 15	14	15	12	14	15	15	15	15	E S 16	E S 15	E S 16	E S 14	E S 16	E S 16	E S 15	E S 15
26	E S 15	E S 14	E S 16	E S 13	E	E S 15	E S 15	E S 15	14	14	16	15	17	16	16	15	E S 15	S	E S 16	E S 15	E S 16	E S 15	E S 15	E S 16
27	E S 15	E S 15	E S 15	E S 16	E S 15	E S 14	E S 17	E S 15	15	15	14	12	14	14	16	17	E S 15	E	E S 16	E S 16	E S 15	E S 15	E S 16	E S 15
28	E S 16	E S 16	E S 15	E S 13	E	E S 15	E S 14	E S 15	14	15	16	16	15	15	15	15	E S 17	E S 15	E S 16	E S 15	E S 16	E S 15	E S 16	E S 15
29	E S 16	E S 14	E S 14	E S 14	E	E S 15	E S 15	E S 15	14	16	16	16	20	17	20	14	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15	E S 15	E S 15
30	E S 14	E S 15	E S 14	E S 13	E S 15	E S 15	E S 15	E S 15	15	16	16	17	17	16	15	11	E S 14	E S 15	E S 15	E S 17	E S 17	E S 17	E S 15	E
31	E S 15	E S 15	E S 15	E S 16	E	E S 14	E S 15	E S 15	E S 16	15	16	16	15	14	16	12	E S 16	E S 15	E S 15	E S 15	E S 16	E S 15	E S 15	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	29	31	31	31	31	31	30	30	31	30	31	31	31	29	30	30	31	30	31	31	31	30	31	30
MED	E S 15	E S 15	E S 15	E S 14	E S 14	E S 15	E S 15	E S 15	15	15	15	15	15	15	15	14	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15	E S 15	E S 15
UQ	E S 16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15	15	16	16	17	18	17	16	16	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16
LQ	E S 15	E S 14	E S 14	E S 13	E	E S 14	E S 15	E S 15	14	15	14	14	14	14	14	12	E S 14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15

DEC. 1973 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S	F 300	F 295	300	275	320	S	345	375	365	355	360	340	355	360	345	360	335	315	330	A	310	S	S 305
2	U S 290	F	F	285	295	320	320	340	360	350	360	350	360	370	360	340	355	335	345	320	335	350	295	S 290
3	290	290	300	295	300	340	350	360	385	380	345	345	375	365	365	360	360	345	340	325	305	S 305	S 335	S
4	S	295	265	305	285	315	S 315	330	S	360	370	355	360	360	360	330	345	345	305	S	310	330	310	310
5	340	A	S	305	270	310	U S 320	S 315	300	I R 330	R 350	R	375	C	C	C	380	325	315	A	S	S 315	S 290	S
6	S	F	U F 280	F 300	F	315	S	S	355	370	350	350	355	375	360	380	355	315	315	310	335	S	S	S
7	S	F 300	F 300	335	350	330	S	370	360	355	380	365	370	370	380	365	370	A	350	305	A	325	320	U S 365
8	295	S 325	F 295	F 315	F 315	345	320	S	390	370	350	345	350	375	380	355	360	A	A	A	F	F 305	F 300	F
9	S 335	F	F	F	F	F	S	350	395	365	355	365	375	380	355	355	390	320	325	320	335	315	U S 305	S
10	U S 305	U S 315	305	285	300	320	310	S 335	375	375	375	370	385	375	345	390	355	340	A	A	305	S 335	315	F 305
11	F 305	F 295	305	F	F	F	U S 340	S 330	375	370	H 330	375	340	375	390	365	305	A	340	365	335	335	300	310
12	A	F 300	315	315	F 325	335	335	360	365	360	350	370	385	390	365	375	385	350	335	350	305	325	295	335
13	310	285	F 295	F	F 320	F	F	U S 345	375	400	390	365	345	375	365	370	360	335	365	315	S 320	355	300	U F 300
14	U F 305	F 295	F 300	F 300	F 300	340	340	370	365	385	345	H 315	375	365	360	370	370	H 320	335	340	360	S 335	F 300	F
15	F	F	F	F	F	F	F 340	U S 350	375	355	390	375	350	385	H 325	350	375	345	320	320	325	335	290	295
16	300	295	310	S 335	345	325	330	345	350	360	370	365	380	C	365	360	350	335	330	310	325	345	305	300
17	S 295	305	S 310	S 310	F 305	F 320	325	S 350	375	355	375	355	365	370	320	360	365	365	335	320	345	S 325	315	310
18	310	300	290	300	305	330	335	340	355	355	370	380	H 300	365	H 350	340	U S 330	325	335	330	330	310	F 320	F 305
19	F	F	U F 315	F 315	F	F 330	F 335	335	375	I C 355	350	380	360	380	330	340	340	370	320	S	335	320	325	295
20	290	305	295	335	F 260	315	290	355	350	350	375	355	350	335	340	355	A	375	325	A	300	275	295	280
21	280	285	280	295	U S 275	S	F 320	S	325	355	H 355	340	360	350	380	365	315	345	340	305	295	320	300	300
22	300	270	U S 295	295	320	365	S	S	360	360	360	345	350	380	360	385	H 300	325	325	330	325	305	S 300	275
23	280	290	S	350	S 325	315	315	335	345	375	360	380	335	365	345	350	375	355	305	325	315	325	295	305
24	295	305	300	325	305	305	315	335	345	340	360	355	350	370	380	380	375	335	320	335	335	310	S 275	U S 285
25	F 275	F	F 310	F	F	F 360	F 320	340	355	360	350	355	A	335	330	395	370	285	355	345	375	335	280	295
26	S 280	290	F 295	U F 305	F 325	U F 355	F 340	345	340	370	355	330	370	390	385	345	365	S	320	335	335	335	F	F
27	F 290	290	290	320	310	340	350	355	385	335	360	340	375	350	335	365	375	320	330	300	325	305	285	275
28	290	300	295	305	320	330	360	S 350	315	345	355	360	375	365	335	365	340	375	335	355	330	A	305	S
29	S	F	F 285	F 310	F 315	335	345	340	360	340	H 300	365	355	325	325	355	375	335	345	320	340	315	300	S 315
30	295	310	310	310	305	330	A	350	375	335	310	335	330	355	375	350	380	305	335	315	320	290	305	300
31	315	345	310	335	295	325	325	345	370	360	370	360	375	360	370	355	345	310	A	350	330	A	315	300
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	23	26	26	25	26	24	27	30	31	31	30	30	29	30	30	30	27	28	25	27	28	28	23
MED	295	300	298	308	305	330	328	345	362	360	355	358	360	370	360	360	360	335	332	325	330	322	300	300
UQ	305	305	310	320	320	340	340	350	375	370	370	365	375	375	370	370	375	345	340	335	335	335	312	308
LQ	290	290	295	300	295	320	320	338	350	352	350	345	350	360	340	350	345	322	320	315	318	310	295	295

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DEC. 1973 | M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F1 (0.01)

135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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											A	A	A	C										
6																								
7																								
8																								
9																								
10																								
11																								
12													L											
13																								
14																								
15																								
16																								
17												L												
18																								
19																								
20												L	L											
21																								
22																								
23																								
24																								
25																								
26																								
27												370	370											
28																								
29																								
30																								
31														410										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												1	1	1										
MED												370	370	410										
UQ																								
LQ																								

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DEC. 1973 | M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1973 | H'F2 (KM) | 135 E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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											A	A	A	C										
6																								
7																								
8																								
9																								
10																								
11																								
12													225											
13																								
14																								
15																								
16																								
17												225												
18																								
19																								
20												240	240											
21																								
22																								
23																								
24																								
25																								
26																								
27												245	220											
28																								
29																								
30																								
31														220										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												3	3	1										
MED												240	225	220										
UQ												242	232											
LQ												232	222											

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DEC. 1973 | H'F2 (KM)

IONOSPHERIC DATA

DEC. 1973 | H'F (KM) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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	290	275	260	275	285	275	250	210	215	215	200	225	215	225	215	210	200	240	250	235	A	265	300	250
2	260	245	250	255	255	250	225	210	200	210	220	205	220	240	220	240	205	230	215	235	225	240	275	290
3	295	295	300	290	280	250	225	215	210	210	200	215	210	230	220	200	215	210	240	260	270	250	260	305
4	S	290	290	265	270	260	250	245	210	215	210	220	215	220	220	230	205	205	250	255	255	220	245	245
5	225	A	265	300	290	250	220	240	A	230	A	A	A	C	C	C	200	225	250	A	205	240	265	255
6	250	270	270	230	220	200	200	205	210	220	225	245	215	210	225	205	200	230	250	250	235	S	260	S
7	S	295	260	230	205	230	235	210	205	E S 245	215	215	215	210	215	215	A 210	A	250	235	A	250	260	280
8	290	245	275	250	230	200	270	210	200	210	215	200	210	205	200	220	210	A	A	A	235	275	300	270
9	225	215	250	235	220	240	220	220	210	205	190	200	H 200	210	210	215	200	250	230	245	245	230	250	265
10	255	250	250	290	255	260	235	220	210	210	200	210	210	215	210	200	200	225	A	A	230	210	255	250
11	250	245	245	225	225	245	200	210	200	215	H 190	225	220	210	210	205	295	A	250	225	245	225	270	260
12	A	305	280	250	250	295	230	205	200	205	225	220	200	215	225	200	195	205	245	220	250	245	260	225
13	250	255	250	270	245	225	220	200	205	200	205	215	220	225	230	220	200	215	210	250	245	215	290	275
14	255	255	285	270	255	245	235	200	210	200	240	H 220	220	225	215	200	200	200	250	225	220	215	290	305
15	275	260	270	265	260	235	210	215	200	230	220	205	200	220	200	225	200	210	245	260	250	215	300	290
16	280	270	260	235	215	250	250	210	210	200	200	205	215	C	215	210	195	250	250	255	240	220	255	260
17	275	260	250	235	230	245	230	220	210	215	225	205	195	215	220	210	200	200	240	235	245	240	250	255
18	250	260	260	260	255	220	260	200	200	200	210	220	225	225	I A 215	220	220	215	215	225	220	265	245	230
19	275	260	270	245	210	200	225	220	200	I C 210	215	215	215	210	210	220	210	200	270	240	240	230	245	300
20	290	265	290	305	325	210	300	200	200	230	210	230	220	235	A 230	210	A	210	265	A	300	255	295	300
21	300	295	315	260	290	225	245	210	220	220	215	215	245	225	215	205	215	205	215	245	250	245	300	250
22	295	345	295	300	235	230	S	S	225	240	230	235	215	215	215	210	200	205	250	245	240	255	270	320
23	300	270	270	220	230	255	280	220	220	215	210	220	210	235	A 245	220	200	210	300	250	260	250	300	275
24	300	275	280	245	250	250	250	220	205	215	225	230	220	220	210	200	210	240	230	230	245	250	305	300
25	285	260	280	250	220	200	235	220	200	210	225	245	A	215	240	I A 220	200	290	220	245	205	245	310	300
26	300	300	280	270	225	205	200	200	200	205	225	210	225	200	A 215	220	205	S	250	205	230	290	300	275
27	300	300	300	270	295	240	240	205	200	240	250	205	220	230	200	215	200	215	250	300	260	270	330	325
28	300	290	295	270	240	230	210	200	215	205	240	225	215	220	245	210	210	200	250	220	240	A	275	290
29	250	285	300	250	230	220	250	205	205	220	220	225	230	200	220	215	210	230	235	250	240	280	285	270
30	275	270	270	260	270	235	A	210	200	220	225	205	200	230	220	200	200	230	215	250	235	290	270	260
31	250	225	255	240	285	260	245	200	200	220	210	240	220	210	220	220	200	235	A	225	240	A	300	300
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	31	31	31	31	29	30	30	31	30	30	29	29	30	30	30	27	28	27	29	28	31	30
MED	275	270	270	260	250	240	235	210	205	215	215	218	215	220	215	212	200	215	250	245	240	245	275	275
UQ	295	290	288	270	270	250	250	220	210	220	225	225	220	225	220	220	210	230	250	250	250	260	300	300
LQ	250	255	260	242	228	222	220	205	200	208	210	205	210	210	210	205	200	205	230	228	235	228	260	255

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DEC. 1973 | H'F (KM)

IONOSPHERIC DATA

DEC. 1973 | H'ES (KM) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S	S	E	S	S	S	S	S	G	100	100	G	G	G	G	G	S	115	S	S	110	100	S	S
2	S	E	S	E	E	105	S	S	G	G	150	G	145	G	150	120	S	S	S	S	S	S	S	S
3	100	100	S	S	S	S	S	100	G	100	G	G	G	G	G	140	110	S	S	110	S	S	S	S
4	S	E	S	100	E	S	S	S	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	S
5	S	110	110	120	S	S	E	115	115	120	110	110	115	C	C	C	S	115	100	100	100	S	S	S
6	S	E	S	S	S	S	S	S	135	115	G	G	G	100	100	150	S	100	100	S	S	S	S	S
7	S	100	100	100	S	S	S	S	G	S	G	G	G	G	G	110	105	105	S	100	100	105	S	S
8	S	S	100	E	S	S	S	S	140	G	115	105	100	G	100	100	100	110	105	105	105	105	100	S
9	S	S	S	S	S	S	S	135	145	115	G	100	100	100	G	100	S	S	S	100	S	S	S	S
10	S	S	E	100	100	S	S	135	120	105	100	G	100	G	100	100	100	S	105	105	100	S	100	100
11	100	S	S	100	100	105	100	S	100	100	G	G	G	G	G	120	105	105	105	105	100	100	S	S
12	100	100	100	S	S	105	105	100	100	G	B	B	B	G	B	B	S	S	S	110	S	S	S	100
13	S	S	S	100	E	S	S	100	S	G	G	G	B	G	G	B	S	110	S	S	S	S	100	S
14	S	S	100	E	100	S	S	S	105	G	G	G	G	G	G	110	S	S	S	S	S	100	S	S
15	S	S	E	100	100	100	S	S	G	110	G	G	G	G	G	G	S	S	S	S	S	S	S	S
16	S	100	S	100	S	S	S	S	135	G	G	G	G	C	G	S	120	105	100	S	S	S	S	S
17	S	S	S	E	E	S	S	S	110	G	G	G	G	G	G	150	S	S	S	S	S	S	S	S
18	S	S	S	S	S	S	S	S	140	G	150	G	G	145	115	120	110	100	100	S	S	S	S	S
19	S	100	100	100	S	100	S	S	G	C	125	G	105	105	100	105	100	100	100	100	S	S	S	S
20	S	105	105	105	S	S	S	S	G	G	G	125	110	115	105	105	105	105	105	105	105	105	S	S
21	S	115	110	105	105	105	110	S	100	125	120	125	115	100	110	110	165	S	S	100	100	100	100	S
22	S	105	105	S	S	S	S	S	100	G	140	115	110	110	110	110	100	105	100	S	S	100	100	100
23	100	100	100	100	100	100	105	S	G	G	G	G	G	145	115	105	S	105	105	S	100	S	S	S
24	S	S	S	S	E	S	S	S	G	G	100	G	G	G	125	120	S	105	S	S	125	105	S	S
25	S	S	S	105	115	S	S	S	G	G	G	140	115	110	105	105	S	S	S	S	S	S	S	S
26	S	S	S	105	105	105	S	S	G	165	G	125	110	105	110	G	100	S	S	S	S	S	S	S
27	S	S	105	110	S	S	S	S	G	160	110	110	G	G	G	G	S	105	S	100	100	S	100	S
28	S	120	S	S	100	S	S	S	175	G	G	120	110	G	G	130	S	S	S	S	S	100	100	100
29	100	S	110	S	E	S	S	S	G	G	125	120	115	G	G	150	105	100	100	100	S	S	S	S
30	S	100	100	S	S	100	100	S	G	135	120	115	G	110	110	G	S	S	S	S	S	105	100	E
31	S	S	S	100	E	S	S	S	110	105	100	G	100	105	G	125	S	S	110	105	100	100	105	S
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	5	12	13	16	9	9	5	6	15	13	14	12	14	12	14	21	13	16	13	14	12	12	9	4
MED	100	100	100	100	100	105	105	108	115	115	118	118	110	108	110	110	105	105	100	102	100	100	100	100
UQ	100	108	105	105	105	105	105	135	138	125	125	125	115	112	115	125	110	108	105	105	105	105	100	100
LQ	100	100	100	100	100	100	100	100	102	105	100	110	100	102	100	105	100	102	100	100	100	100	100	100

The Radio Research Laboratories, Japan

DEC. 1973 | H'ES (KM)

IONOSPHERIC DATA

DEC. 1973 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 2	L 1							F 1			F 2	F 1		
2						F 1					H 1		H 1		H 1	C 1								
3	F 1	F 1						L 1		L 1						H 1	C 1			F 1				
4				F 1																				
5		F 3	F 2	F 1				C 2	C 2	C 1	L 2	L 1	CL 21					F 1	F 2	F 3	F 1			
6									H 1	C 2				L 2	L 1	HL 11		F 1	F 1					
7		F 1	F 1	F 1												L 2	L 2	F 4		F 1	F 3	F 2		
8			F 1						H 1		C 1	L 1	L 2		L 2	L 2	L 1	F 2	F 2	F 2	F 1	F 1	F 1	
9								H 1	H 1	C 1		L 1	L 1	L 1		L 1				F 1				
10				F 1	F 1			H 1	C 2	L 1	L 1		L 2		L 1	L 1	L 1		F 3	F 3	F 1		F 1	F 1
11	F 2			F 1	F 1	F 2	F 1		L 1	L 1						C 1	C 2	F 2	F 2	F 1	F 1			
12	F 1	F 1	F 1			F 2	F 2	L 1	L 1											F 1				F 1
13				F 1				C 1										F 1					F 1	
14			F 1		F 1			L 1														F 1		
15				F 1	F 1	F 1				L 1														
16		F 1		F 1					H 1								C 1	F 1	F 2					
17									L 1							H 1								
18									H 1		H 1			H 1	C 2	C 2	L 2	F 2	F 2					
19		F 2	F 2	F 1		F 1					C 1		L 1	L 2	L 1	L 2	L 2	F 1	F 3	F 1				
20		F 1	F 1	F 1								C 1	C 2	C 1	L 2	L 2	L 3	F 1	F 2	F 4	F 2	F 2		
21		F 1	F 3	F 2	F 3	F 2	F 1		L 1	C 1	C 2	C 1	C 1	L 1	L 1	L 1	H 1			F 1	F 1	F 1	F 1	
22		F 2	F 1						L 1		H 1	C 1	L 1	L 1	L 1	L 1	L 1	F 1	F 1			F 1	F 1	F 1
23	F 1	F 1	F 2	F 1	F 2	F 1	F 1							H 1	C 2	L 1		F 1	F 2		F 1			
24											L 1				C 1	C 1		F 1			F 2	F 1		
25				F 2	F 1							LH 11	C 3	L 1	L 2	L 3								
26				F 1	F 1	F 1				H 1		C 1	L 2	L 1	L 2		L 1							
27			F 1	F 1						H 1	L 2	L 1						F 1		F 1	F 1		F 1	
28		F 1			F 2				H 1			C 1	L 1			H 1						F 1	F 1	F 1
29	F 1		F 1								C 1	C 1	C 1			HL 11	L 2	F 1	F 1	F 1				
30		F 1	F 1			F 1	F 1			H 1	C 1	C 1		C 2	C 1							F 1	F 1	
31				F 1					C 2	L 1	L 2		L 2	L 1		C 1			F 2	F 1	F 2	F 3	F 3	
.	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																								

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DEC. 1973 | TYPES OF ES

IONOSPHERIC DATA

DEC. 1973 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 34	F 33	34	34	34	F 32	35	69	62	71	76	83	80	72	66	62	54	I R 34	36	37	Z 37	26	F	F
2	F 31	F 32	F 31	F 31	F 31	F 31	S 34	52	67	71	65	71	60	66	Z 65	47	65	40	A	A	32	29	26	29
3	F	31	F 30	29	28	27	30	57	70	67	62	83	70	58	64	57	51	34	27	30	42	F 24	F 28	30
4	30	30	31	31	31	30	33	54	72	66	68	82	75	66	58	59	68	46	39	37	40	34	31	31
5	32	28	30	I A 28	29	29	40	I A 41	I A 53	88	R 109	I A 101	75	65	Z 65	72	64	38	41	50	48	F 28	35	F 38
6	40	38	38	40	39	46	59	I R 64	57	61	72	97	87	73	H 68	69	57	42	38	R 42	40	41	F 34	F
7	32	F 31	32	31	29	20	23	48	59	58	63	74	62	56	57	64	47	34	28	33	28	I A 30	I R 30	F
8	F	F 32	31	31	C	C	C	C	C	C	69	74	61	68	59	53	49	45	30	38	I R 32	26	I A 31	I R 34
9	36	36	35	34	31	29	31	51	77	82	60	79	H 59	63	58	54	47	38	33	39	39	32	31	31
10	32	31	32	30	31	30	33	48	67	75	69	79	64	63	62	68	51	31	29	32	34	F 33	F 33	35
11	F 36	37	36	37	35	38	28	48	61	65	65	67	78	74	65	59	56	H 30	I R 31	I A 35	35	A	A	A
12	I A 30	30	31	31	27	25	25	I A 49	57	I R 56	54	88	74	61	65	57	46	34	26	33	28	32	31	32
13	32	33	34	33	32	31	30	52	58	60	H 61	63	62	62	66	57	46	30	32	26	30	31	32	31
14	33	32	33	F 31	30	28	23	46	52	69	64	67	69	79	74	62	45	31	26	I R 34	31	F 28	27	F 27
15	F	F	31	30	30	27	25	48	48	55	68	74	H 67	59	60	62	54	32	30	31	I R 40	F 44	F 30	F 30
16	32	32	33	36	31	25	25	45	57	64	56	74	73	59	53	56	60	31	36	40	29	31	26	27
17	I R 28	28	28	32	27	26	25	47	62	61	H 73	74	67	64	61	58	69	41	30	31	30	31	29	24
18	30	30	31	31	29	F	31	48	55	I R 58	59	63	62	64	70	56	51	35	39	32	28	26	28	F 30
19	F	F	F	F 34	29	24	F 26	44	60	62	55	H 61	H 68	68	59	64	60	38	27	32	31	30	F 31	F 30
20	F 31	F 34	F 33	33	29	30	29	51	59	65	69	71	78	84	76	65	52	42	41	29	28	34	30	30
21	31	32	32	35	36	F	F 23	47	63	64	79	70	79	90	H 73	68	48	42	48	36	34	27	29	30
22	30	31	33	33	32	21	21	37	59	H 67	88	87	94	69	62	54	50	45	I A 46	I A 30	30	F	F	F 29
23	30	33	F 34	41	25	23	26	47	57	65	66	68	72	67	H 71	75	46	I A 34	29	28	32	26	27	28
24	29	29	31	33	27	26	26	47	59	56	73	73	76	75	62	57	57	H 34	33	32	32	28	26	27
25	29	29	31	32	33	23	22	45	I R 61	57	63	62	62	68	64	69	61	35	31	39	29	I R 22	F	F
26	F	F	F	F	37	I A 24	I A 23	38	52	57	60	72	69	H 62	62	65	54	I R 36	29	29	29	I R 26	22	F 26
27	28	28	29	29	27	29	24	45	54	Z 52	68	84	H 70	64	H 56	57	54	28	25	31	26	27	24	F
28	28	28	28	32	32	31	28	42	49	52	57	72	65	59	H 55	74	49	33	I R 26	35	23	26	26	28
29	29	30	29	31	33	27	F 27	42	53	59	68	78	77	74	63	66	63	37	39	27	28	28	26	I R 26
30	37	30	30	30	29	29	28	47	64	59	72	92	59	77	69	58	61	35	35	31	35	27	28	28
31	26	28	27	28	28	30	35	42	50	H 54	78	63	69	77	58	61	53	32	39	38	32	23	26	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	26	28	29	30	30	28	30	30	30	30	31	31	31	31	31	31	31	31	30	30	31	29	27	25
MED	31	31	31	32	30	28	28	47	59	62	68	74	69	66	63	61	54	35	32	32	32	28	29	30
UQ	32	32	33	34	32	30	31	51	62	67	72	82	76	74	66	66	60	39	39	37	35	31	31	31
LQ	29	30	30	31	29	25	25	45	54	57	62	69	63	62	59	57	49	32	29	31	29	26	26	27

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DEC. 1973 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 FOF1 (0.01 MHZ) 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L 370		L	L 370	L									
2									L		380	L	L	L										
3										L	U L 380	H 400	L	L	L									
4										L	L	L	L	L										
5										A	A	A	A	L										
6										L	L	L	U L 400	L	L									
7										L	L 350	H 380	L	L										
8										C	L	L	L	L	L									
9										L	U L 390	370	L	L	L									
10										L	L	U L 400	L	L	U L 310									
11										L	H 470	L 430	L 400	L 390	L									
12										A	U L 360	L	L	L	L									
13										L	360	L	L	L	L									
14											L 390	380	460	L	L									
15										L	L 400	L	L 370	L										
16										L	U L 410	L	L	L	L									
17										L	L 420	L	U L 410	U L 400	L									
18									L	L	L	L	L	L										
19											L	L	L	390										
20										L	L	L	L	L	L									
21											U L 380	L	U L 450	L	L									
22											L	L	L	L 380	L									
23										L	L	L	L	L	L									
24											L	L	L	L	L									
25											L	L	L	L	L									
26										L	420	390	L	L	L									
27										H 360	L	L	L	L	L									
28									L	L	L	L	L 390	L	L									
29										L	U L 400	L	L	L	L									
30										L	A	L	L 400	370	L									
31											L	L 400	L	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	14	9	8	6	1									
MED										H 360	L 390	390	L 400	L 385	U L 310									
UQ											L 410	L 400	U L 430	L 390										
LQ											L 380	380	L 395	L 370										

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DEC. 1973 FOF1 (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOE (0.01 MHZ) | 135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39 43.5 N. Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	I A 235	270	290	300	305	285	250	185	B							
2								S	210	I A 260	280	295	305	295	265	230	S							
3								B	A	275	285	I A 295	300	290	275	230	A							
4								165	235	275	285	295	300	285	260	215	A							
5								A	A	A	A	A	A	295	250	230	175							
6								B	220	265	275	285	295	275	245	A	A							
7								A	235	265	275	280	290	A	A	A	S							
8								C	C	C	270	I A 280	290	285	275	A	A							
9								A	A	255	270	280	285	I A 290	280	235	B							
10								A	220	I A 255	275	285	290	280	250	210	A							
11								A	A	265	275	285	290	285	270	220	B							
12								A	A	A	B	B	B	B	B	B	B							
13								B	215	260	I B 270	285	295	295	275	240	A							
14								B	I A 215	I A 270	275	285	295	295	280	230	S							
15								B	210	260	275	295	295	280	255	215	B							
16								A	225	260	280	290	300	295	280	240	B							
17								B	225	I A 260	280	295	300	290	275	220	B							
18								B	A	265	280	290	300	295	I A 265	230	165							
19								S	A	265	280	300	305	295	270	230	A							
20								B	225	265	275	295	300	295	260	225	185							
21								B	I A 220	260	285	300	I A 300	I A 290	275	235	A							
22								A	I A 230	265	275	I A 290	305	290	I A 265	240	175							
23								A	225	265	280	295	305	290	265	225	A							
24								B	220	255	275	290	300	285	265	A	B							
25								B	220	265	I A 285	295	305	290	270	240	170							
26								A	A	265	280	295	300	I A 300	I A 280	245	180							
27								S	230	265	280	295	300	300	285	250	B							
28								S	210	255	275	285	300	295	270	230	A							
29								S	225	260	280	290	I A 300	I A 300	285	250	B							
30								S	225	260	270	I A 280	I A 295	290	270	250	200							
31								S	210	260	A	A	A	A	275	230	B							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	22	28	28	28	28	28	29	26	7							
MED								165	222	265	278	290	300	290	270	230	175							
UQ									225	265	280	295	300	295	275	240	182							
LQ									215	260	275	285	295	285	265	225	172							

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DEC. 1973 | FOE (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E S 14	E S 14	J X 21	M 20	E S 14	E S 14	E S 14	E B 18	J X 26	G	G	G	J X 31	G	G	G	E B 18	J X 29	J X 20	E S 14	E S 14	J X 29	E S 14	E S 14
2	E S 14	J X 21	E S 14	J X 26	J X 20	J X 16	E S 14	E S 15	G	J X 31	G 21	G	G	G	G	28	J X 33	J X 66	J X 51	J X 50	J X 26	E S 14	E S 14	E S 14
3	E B 18	E S 14	E S 14	M 17	E S 14	E S 14	E S 14	E B 16	J X 34	J X 44	J X 36	J X 42	G	G	G	G	J X 20	J X 20	E S 14	E S 14	E S 14	E S 14	E S 14	J X 21
4	J X 20	E S 14	M 20	E S 14	M 21	J X 21	E S 14	G	G	G	G	G	G	J X 29	G	G	J X 20	J X 21	J X 18	M 21	M 22	J X 30	J X 26	J X 20
5	J X 19	J X 22	J X 23	J X 34	E S 14	E S 14	J X 30	J X 47	J X 67	J X 92	J X 103	J X 108	J X 50	J G 28	G	G	G	24	J X 20	J X 82	J X 40	J X 29	J X 25	J X 19
6	E S 14	E S 14	M 20	M 21	E S 14	E S 14	J X 22	E B 18	G	G	G	G	J G 29	G	J X 28	J X 25	J X 25	J X 30	J X 24	J X 20	M 21	E S 14	E S 14	E S 14
7	J X 20	J X 20	J X 18	E S 14	M 22	J X 18	J X 20	J X 28	J X 28	J G 23	G	G	J G 26	J X 36	J X 35	J X 30	J X 38	J X 27	J X 40	J X 25	J X 46	J X 55	J X 18	J X 21
8	E S 14	J X 18	E S 14	J X 18	C	C	C	C	C	C	33	J X 43	G	G	J X 29	J X 39	J X 36	J X 31	E S 14	E S 14	J X 32	J X 43	J X 40	J X 30
9	J X 23	J X 19	J X 18	E S 14	E S 13	E S 14	E S 14	21	28	29	G	G	32	J X 40	G	G	E B 19	E S 15	E S 14	M 21	E S 14	M 21	E B 19	J X 18
10	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	20	28	J X 35	G	G	G	G	G	25	M 20	M 22	E S 14	E S 14	J X 44	J X 34	J X 38	J X 30
11	E S 14	J X 28	J X 20	E S 14	J X 22	E S 14	E S 14	J X 21	J X 54	27	G	39	34	J X 32	G	24	E B 19	J X 20	J X 36	J X 50	J X 44	J X 59	J X 54	J X 54
12	J X 32	J X 26	E S 14	J X 18	M 22	E S 14	E S 14	J X 65	J X 76	J X 47	E B 32	E B 38	E B 34	E B 31	E B 34	E B 28	E B 20	E S 14	E S 14	E S 14	E S 14	E S 14	J X 29	E S 14
13	J X 20	J X 34	J X 26	J X 24	J X 20	E S 14	E S 14	E B 17	G	J X 25	E B 28	G	G	G	G	G	J X 24	E S 14	E S 14	M 21	E S 14	M 20	M 22	J X 18
14	E S 14	E S 14	J X 20	J X 20	E S 14	E S 14	E S 14	E B 18	24	30	G	G	G	G	G	G	E S 16	M 21	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
15	E S 14	J X 19	E S 14	E S 14	E S 14	E S 14	E S 14	E B 16	G	G	32	G	G 25	G	J X 27	G	E B 19	E B 17	E S 14	E B 20	E B 20	E S 14	E S 14	E S 14
16	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	J X 21	31	29	G	G	G 27	G	G	G	E B 19	J X 19	J X 51	J X 30	J X 30	E S 14	J X 26	E S 14
17	E B 19	E S 14	J X 17	E S 14	E S 14	J X 28	E S 14	E B 18	G	J X 39	G	G	G	G	G	G	E B 19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
18	E S 14	M 20	M 18	E S 14	E S 14	E S 14	E S 14	E B 18	25	G	34	35	34	G	J X 28	26	G	E S 14	E S 14	M 20	E S 14	E B 19	E S 14	E S 14
19	E S 14	E S 14	E S 14	E S 14	E S 14	M 20	E S 14	J X 20	28	31	34	39	J X 39	G	29	28	20	J X 20	M 20	E S 14	E S 14	E S 14	E S 14	E S 14
20	E S 14	E S 14	M 18	J X 18	E S 14	E S 14	E S 14	E B 18	G	28	J X 34	33	40	32	G	G	G	E S 14	E S 14	E S 14	E S 14	J X 20	J X 21	M 21
21	J X 25	J X 18	J X 18	J X 20	J X 48	J X 39	E S 14	E B 18	26	29	33	J G 29	J X 40	33	31	G	J X 20	E S 14	J X 44	J X 23	J X 18	E S 14	E B 19	E S 14
22	E S 14	E S 14	E S 14	M 20	J X 24	E S 14	E S 14	20	28	G	34	J X 45	J X 40	G	29	G	J X 30	J X 48	J X 66	J X 39	E S 14	E S 14	E S 14	E S 14
23	E S 14	E S 14	E S 14	J X 20	J X 19	J X 34	J X 43	J X 20	G	G	G	G	G	34	G	29	J X 32	J X 46	J X 26	E B 19	E B 18	E S 14	E S 14	J X 18
24	M 20	J X 18	E S 14	E S 14	E S 14	E S 14	E S 14	E B 17	G	G	G	33	G	32	29	27	E B 19	E S 14	E S 14	E S 14	E S 14	E S 14	M 21	J X 20
25	E S 14	M 18	E S 14	E S 14	E B 18	E S 14	E S 14	E B 18	24	G	34	J X 45	J X 40	J X 36	G	G	G	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
26	E S 14	E S 15	E S 14	M 20	E S 14	M 24	J X 24	J X 26	J X 25	G	G	33	34	31	31	G 24	J X 25	J X 21	E S 14	E S 14	E S 14	E S 14	E B 18	E S 14
27	J X 20	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 16	G	G	G	33	36	G	G	G	E B 19	E B 18	E S 14	M 22	E S 14	E S 14	E S 14	E S 14
28	E S 14	J X 19	J X 21	J X 23	J X 18	E B 18	J X 19	E S 15	G	29	30	G	G	G	G	G	21	E B 18	E B 20	E S 14	E S 14	E S 14	E S 14	E B 18
29	E S 14	M 21	E S 14	E S 14	J X 18	E S 14	E S 14	E S 16	G	G	G 23	J X 41	35	32	G	G	E B 19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E B 19
30	E S 14	E S 14	M 18	J X 18	E S 14	E S 14	E S 14	E S 14	G	32	40	J X 38	J X 38	G	G	G	G	E B 17	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
31	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	G	G	J X 39	30	J X 45	J X 63	31	G	E B 19	E S 14	J X 31	J X 40	J X 34	J X 18	J X 19	J X 44
	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	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E S 14	E S 15	E S 14	17	E S 14	E S 14	E S 14	E 18	24	26	E G 23	30	30	G	G	G	E G 19	19	E S 14	E E 19	E S 14	E S 14	E S 14	E S 14
UQ	20	J X 20	J X 19	J X 20	J X 20	18	E S 14	J X 20	28	31	34	38	37	32	28	26	J X 22	J X 23	J X 25	J X 22	J X 24	J X 20	J X 22	J X 20
LQ	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E B 16	G	G	G	G	G	G	G	G	E B 19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14

DEC. 1973 | FOES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 14	E S 14	E	E	E S 14	E S 14	E S 14	E B 18	26	G	G	G	25	G	G	G	E B 18	29	19	E S 14	E S 14	E	E S 14	E S 14
2	E S 14	17	E S 14	E	E	E	E S 14	E S 15	G	29	G 20	G	G	G	G	27	27	24	A	A	E	E S 14	E S 14	E S 14
3	E B 18	E S 14	E S 14	E	E S 14	E S 14	E S 14	E B 16	30	21	22	31	G	G	G	G	18	18	E S 14	E S 14	E S 14	E S 14	E S 14	E
4	E	E S 14	E	E S 14	E	E	E S 14	G	G	G	G	G	G	24	G	G	18	18	E	E	E	E	19	E
5	19	17	18	A	E S 14	E S 14	28	A	A	75	102	A	50	G 27	G	G	G	E	18	30	19	19	E	E
6	E S 14	E S 14	E	E	E S 14	E S 14	20	E B 18	G	G	G	G	G 24	G	20	25	18	24	18	17	E	E S 14	E S 14	E S 14
7	19	E	E	E S 14	E	E	E	19	19	G 19	G	G	G 25	32	31	24	19	E	18	24	21	A	E	18
8	E S 14	E	E S 14	E	C	C	C	C	C	C	31	39	G	G	24	31	25	E	E S 14	E S 14	20	E	A	26
9	23	E	E	E S 14	E S 13	E S 14	E S 14	19	26	28	G	G	32	30	G	G	E B 19	E S 15	E S 14	E	E S 14	E	E B 19	E
10	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	24	29	G	G	G	G	G	24	18	22	E S 14	E S 14	18	17	E	E
11	E S 14	E	17	E S 14	E	E S 14	E S 14	20	40	27	G	32	G	25	G	G	E B 19	18	29	A	18	A	A	A
12	A	18	E S 14	E	E	E S 14	E S 14	A	32	37	E B 32	E B 38	E B 34	E B 31	E B 34	E B 28	E B 20	E S 14	E S 14	E S 14	E S 14	E S 14	E	E S 14
13	18	19	19	18	16	E S 14	E S 14	E B 17	G	21	E B 28	G	G	G	G	G	20	E S 14	E S 14	E	E S 14	E	E	E
14	E S 14	E S 14	E	E	E S 14	E S 14	E S 14	E B 18	24	29	G	G	G	G	G	G	E S 16	E	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
15	E S 14	E	E S 14	E S 14	E S 14	E S 14	E S 14	E B 16	G	G	31	G	G 24	G	20	G	E B 19	E B 17	E S 14	E B 20	E B 20	E S 14	E S 14	E S 14
16	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	27	29	G	G	G 23	G	G	G	E B 19	19	29	18	19	E S 14	20	E S 14
17	E B 19	E S 14	E	E S 14	E S 14	E	E S 14	E B 18	G	35	G	G	G	G	G	G	E B 19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
18	E S 14	E	E	E S 14	E S 14	E S 14	E S 14	E B 18	23	G	32	34	31	G	28	26	G	E S 14	E S	E	E S 14	E B 19	E S 14	E S 14
19	E S 14	E S 14	E S 14	E S 14	E S 14	E	E S 14	18	28	29	31	34	33	G	29	28	19	E	E	E S 14	E S 14	E S 14	E S 14	E S 14
20	E S 14	E S 14	E	15	E S 14	E S 14	E S 14	E B 18	G	28	32	32	36	31	G	G	G	E S 14	E S 14	E S 14	E S 14	18	17	E
21	21	18	E	E	17	25	E S 14	E B 18	26	29	31	G 27	33	31	30	G	18	E S 14	E	19	E	E S 14	E B 19	E S 14
22	E S 14	E S 14	E S 14	E	18	E S 14	E S 14	20	28	G	33	33	G	G	28	G	14	20	A	A	E S 14	E S 14	E S 14	E S 14
23	E S 14	E S 14	E S 14	20	E	19	18	18	G	G	G	G	G	33	G	28	25	A	20	E B 19	E B 18	E S 14	E S 14	E
24	E	E	E S 14	E S 14	E S 14	E S 14	E S 14	E B 17	G	G	G	32	G	32	29	26	E B 19	E S 14	E S 14	E S 14	E S 14	E S 14	E	E
25	E S 14	E	E S 14	E S 14	E B 18	E S 14	E S 14	E B 18	24	G	32	33	27	24	G	G	G	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
26	E S 14	E S 15	E S 14	E	E S 14	A	A	19	24	G	G	32	33	30	29	G 19	E	18	E S 14	E S 14	E S 14	E S 14	E B 18	E S 14
27	E	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 16	G	G	G	33	36	G	G	G	E B 19	E B 18	E S 14	E	E S 14	E S 14	E S 14	E S 14
28	E S 14	E	E	E	E	E B 18	E	E S 15	G	28	30	G	G	G	G	G	19	E B 18	E B 20	E S 14	E S 14	E S 14	E S 14	E B 18
29	E S 14	E	E S 14	E S 14	E	E S 14	E S 14	E S 16	G	G	G 20	38	33	32	G	G	E B 19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E B 19
30	E S 14	E S 14	E	E	E S 14	E S 14	E S 14	E S 14	G	31	38	33	33	G	G	G	G	E B 17	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
31	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	G	G	31	29	35	31	29	G	E B 19	E S 14	24	21	25	E	E	21
	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	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E S 14	E S 14	E S 14	14	E S 14	E S 14	E S 14	E 18	21	21	E G 20	28	G 24	G	G	G	E G 19	E E 15	E S 14	E E 14	E S 14	E S 14	E S 14	E S 14
UQ	E E 16	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	26	29	31	33	33	30	27	24	E B 19	18	18	18	E E 18	E S 14	E E 16	E S 14
LQ	E S 14	E	E	E	E	E S 14	E S 14	E B 16	G	G	G	G	G	G	G	G	E G 17	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E

The Radio Research Laboratories, Japan

DEC. 1973 | FBES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	15	16	17	17	18	16	16	15	18	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
2	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	17	15	16	18	19	18	18	15	15	E S 17	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
3	18	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	16	15	16	15	15	16	14	16	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
4	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	15	16	15	14	14	17	15	15	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
5	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	14	15	17	17	19	18	16	15	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
6	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	15	15	16	15	15	14	14	14	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
7	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	14	14	15	15	17	15	15	15	16	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
8	E S 14	E S 14	E S 14	E S 14	C	C	C	C	C	C	15	18	18	18	15	15	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
9	E S 14	E S 14	E S 14	E S 14	E S 13	E S 14	E S 14	15	15	17	17	17	15	17	18	17	19	E S 15	E S 14	E S 14	E S 14	E S 14	19	E S 14
10	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	15	15	15	15	15	17	17	15	15	14	E S 17	E S 14	E S 14	E S 14	E	E S 14	E S 14
11	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	14	16	16	17	18	15	16	18	15	19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
12	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	15	19	26	32	38	34	31	34	28	20	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
13	E S 14	E S 14	E S 14	E S 14	E	E S 14	E S 14	17	15	17	28	18	18	18	18	18	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	15	16	16	15	18	16	16	15	E S 16	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	16	15	16	15	16	16	15	14	16	19	17	E S 14	20	20	E S 14	E S 14	E S 14
16	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	15	15	17	17	18	18	21	18	15	19	18	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
17	19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	16	16	15	15	15	15	16	14	19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
18	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	15	17	15	16	15	17	15	15	14	E S 14	E S 14	E S 14	E S 14	19	E S 14	E S 14	E S 14
19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	15	14	17	17	17	15	15	15	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
20	E S 14	E S 14	E S 14	E	E S 14	E S 14	E S 14	18	15	15	15	15	15	15	15	15	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
21	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	15	14	17	16	16	17	15	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	19	E S 14	E S 14
22	E S 14	E S 14	E S 14	E S 14	E S 13	E S 14	E S 14	14	15	15	16	17	14	17	15	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
23	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	14	15	15	15	18	19	18	16	15	16	E S 14	E S 14	19	18	E S 14	E S 14	E S 14	E S 14
24	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	17	15	16	16	15	17	14	15	17	19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
25	E S 14	E S 14	E S 14	E S 14	18	E S 14	E S 14	18	15	17	16	14	13	16	16	15	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
26	E S 14	E S 15	E S 14	E S 14	E S 14	E S 14	E S 14	14	14	15	14	16	17	19	17	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	18	E S 14
27	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 16	15	15	15	15	15	16	15	15	19	18	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
28	E S 14	E S 14	E S 14	E S 14	E S 14	18	E S 14	E S 15	15	15	17	15	17	15	15	15	14	18	20	E S 14	E S 14	E S 14	E S 14	E S 14	18
29	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 16	16	17	16	18	18	19	22	18	19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	19
30	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	17	17	18	18	17	17	14	16	15	17	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
31	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	15	17	14	17	17	15	18	15	19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	15	15	16	16	17	17	16	15	15	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
UQ	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	18	15	17	17	18	18	18	18	16	19	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
LQ	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	14	15	15	15	15	15	15	15	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14

DEC. 1973 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 295	F 300	295	305	300	F 305	315	340	340	340	340	350	345	355	365	355	340	I R 310	310	330	Z 345	345	F	F
2	F 305	F 295	F 300	F 300	F 300	F 305	S 340	355	345	345	360	355	355	335	Z 350	375	340	350	A	A	310	330	300	300
3	F	295	F 305	285	290	305	315	350	355	360	340	345	340	345	345	340	355	320	310	325	340	F 335	F 285	300
4	305	305	295	300	295	300	310	340	340	350	340	345	335	340	350	340	340	330	325	310	330	305	295	315
5	305	310	315	I A 310	305	285	335	I A 335	I A 310	325	R 340	I A 350	345	335	Z 325	335	345	310	300	310	340	F 295	295	F 295
6	280	290	290	305	310	310	330	I R 350	335	340	320	340	335	340	H 330	340	345	320	305	R 315	325	320	F 300	F
7	290	F 295	305	315	335	300	305	340	355	350	330	345	355	345	340	360	335	325	305	335	285	I A 310	I R 300	F
8	F	F 310	320	305	C	C	C	C	C	C	365	340	360	355	345	345	330	335	305	325	I R 335	290	I A 295	I R 285
9	315	315	305	315	315	310	320	340	365	360	350	355	H 330	355	340	350	340	355	305	310	345	310	295	305
10	295	305	300	295	305	300	320	340	345	360	350	355	360	350	320	355	345	305	315	310	315	F 315	F 310	305
11	F 310	315	315	310	320	330	320	350	365	380	345	330	340	350	355	340	340	H 325	I R 335	I A 330	335	A	A	A
12	I A 280	275	305	325	325	285	320	I A 340	350	I R 340	315	345	355	350	355	340	335	310	290	335	310	305	305	305
13	305	300	290	290	295	315	315	345	355	365	H 350	345	350	335	350	335	335	315	310	320	325	305	295	295
14	305	305	295	F 305	310	320	305	335	355	360	340	330	325	340	350	355	355	315	285	I R 320	315	F 325	300	F 290
15	F	F	290	295	305	300	310	345	355	350	335	350	H 325	340	340	335	345	320	305	320	I R 320	F 350	F 305	F 280
16	280	295	290	335	320	295	290	340	350	360	325	330	335	350	355	340	360	340	335	330	315	330	285	290
17	I R 295	285	310	310	305	290	295	340	355	335	H 330	345	350	320	360	345	345	330	315	315	305	325	340	290
18	300	315	315	320	305	F	330	345	360	I R 355	360	345	340	330	355	355	340	330	315	330	320	305	290	F 310
19	F	F	F	F 325	315	310	F 290	330	355	350	355	H 325	H 325	355	360	340	350	340	315	320	305	320	F 305	F 300
20	F 295	F 290	F 285	295	270	295	310	355	355	340	345	320	330	350	335	355	335	310	335	310	295	295	300	280
21	285	295	290	305	305	F	F 310	310	350	345	345	345	310	340	H 340	355	355	310	330	330	340	305	270	280
22	270	270	280	310	325	325	295	325	340	H 330	340	335	340	345	360	345	340	290	I A 340	I A 320	325	F	F	F 280
23	280	285	F 290	320	290	280	290	340	350	340	350	330	340	345	H 325	350	370	I A 335	330	290	315	300	280	285
24	290	290	290	320	295	285	290	340	350	350	350	355	340	350	355	360	340	H 305	325	330	315	300	285	275
25	275	300	295	310	335	310	310	340	I R 350	355	350	325	350	330	330	320	355	315	305	340	340	I R 300	F	F
26	F	F	F	F	350	I A 360	I A 320	340	350	350	340	340	325	H 325	340	345	335	I R 335	315	325	330	I R 335	305	F 285
27	280	280	305	305	305	325	300	340	365	Z 335	315	340	H 350	360	H 335	350	355	320	285	305	305	305	285	F
28	285	270	295	320	300	330	320	350	355	345	350	345	340	355	H 330	350	345	335	I R 280	330	305	310	300	295
29	295	285	285	305	335	315	F 305	335	360	350	330	345	335	345	325	340	360	320	335	310	320	315	290	I R 295
30	320	300	300	305	315	305	330	335	355	335	345	365	330	340	350	360	350	335	320	305	345	295	285	290
31	300	330	300	305	300	320	325	360	360	H 330	335	350	335	345	355	340	345	305	335	330	335	295	280	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	26	28	29	30	30	28	30	30	30	30	31	31	31	31	31	31	31	31	30	30	31	29	27	25
MED	295	295	295	305	305	305	312	340	355	350	340	345	340	345	345	345	345	320	315	320	320	310	295	295
UQ	305	305	305	315	320	318	320	345	355	355	350	350	350	350	355	355	352	335	330	330	335	325	300	300
LQ	280	288	290	305	300	298	305	340	350	340	335	338	332	340	335	340	340	310	305	310	312	300	285	285

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DEC. 1973 | M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F1 (0.01) | 135 E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39 43.5 N. Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 400		L	L 395	L									
2									L		410	L	L	L										
3										L	U L 395	H 395	L	L	L									
4										L	L	L	L	L										
5										A	A	A	A	L										
6										L	L	L	U L 360	L	L									
7										L	L 400	H 375	L	L										
8										C	L	L	L	L	L									
9										L	U L 385	405	L	L	L									
10										L	L	U L 380	L	L	U L 390									
11										L	H 360	L 365	L 375	L 380	L									
12										A	U L 435	L	L	L	L									
13										L	390	L	L	L	L									
14											L 365	385	350	L	L									
15										L	L 370	L	L 405	L										
16										L	U L 375	L	L	L	L									
17										L	L 365	L	U L 375	U L 375	L									
18									L	L	L	L	L	L										
19											L	L	L	380										
20										L	L	L	L	L	L									
21											U L 385	L	U L 360	L	L									
22											L	L	L	L 370	L									
23										L	L	L	L	L	L									
24											L	L	L	L	L									
25											L	L	L	L	L									
26										L	380	380		L	L									
27										H 415	L	L	L	L	L									
28									L	L	L	L	L 385	L	L									
29										L	U L 355	L	L	L	L									
30										L	A	L	L 375	375	L									
31											L	L 380	L	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	14	9	8	6	1									
MED										H 415	L 382	380	L 375	L 378	U L 390									
UQ											U L 395	395	L 380	L 380										
LQ											L 365	L 380	L 360	L 375										

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DEC. 1973 | M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1973 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										245	245	250	245	240	230									
2									230		230	235	230	245										
3										230	235	245	250	235	235									
4										230	235	240	245	235										
5										290	I A 265	I A 245	235	235										
6										240	250	245	250	245	225									
7										230	235	240	235	230										
8										C	225	245	225	230	230									
9										220	235	235	215	230	220									
10										225	235	230	225	225	240									
11										215	270	280	250	235	230									
12										225	235	250	235	225	230									
13										215	225	220	220	255	250									
14											245	245	300	230	235									
15										235	255	235	235	250										
16										230	250	245	250	235	230									
17										250	255	240	240	250	225									
18									215	215	215	245	230	250										
19											230	245	235	235										
20										245	255	260	245	235	250									
21											235	230	255	250	225									
22											240	265	245	230	210									
23										240	225	245	225	240	240									
24											240	235	245	235	220									
25											230	235	230	255	240									
26										225	255	250	290	240	235									
27										240	270	250	235	225	230									
28									215	215	235	250	230	235	235									
29										240	270	250	260	240	230									
30										250	240	230	245	250	230									
31											265	235	260	240	225	235								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	22	31	31	31	31	24	1								
MED									215	230	240	245	240	235	230	235								
UQ									222	240	255	250	250	245	235									
LQ									215	225	235	235	230	232	225									

The Radio Research Laboratories, Japan

DEC. 1973 | H'F2 (KM)

IONOSPHERIC DATA

DEC. 1973 | H'F (KM) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	280	275	290	270	270	265	255	215	215	230	210	200	205	205	235	230	210	I A 240	250	240	230	210	320	320
2	295	300	280	275	280	270	240	215	200	230	215	215	190	205	225	205	245	220	A	A	245	230	280	275
3	I B 265	290	290	290	285	270	250	235	225	230	200	H 180	240	200	215	225	205	230	250	245	215	245	300	255
4	260	260	295	275	285	270	260	230	210	215	210	235	230	235	235	235	220	235	240	250	210	245	270	245
5	245	260	260	I A 270	280	300	230	A	A	A	A	A	A	220	230	235	215	225	255	250	210	250	295	290
6	290	295	285	250	235	250	230	200	200	235	240	240	225	245	235	225	225	240	255	230	245	225	265	315
7	290	290	255	240	205	290	250	215	205	210	190	H 180	235	I A 220	240	220	220	200	290	240	A 300	I A 245	255	305
8	290	260	240	260	C	C	C	C	C	C	I A 205	I A 215	200	230	215	215	235	235	280	225	240	290	I A 290	I A 300
9	285	250	255	250	230	265	250	220	225	235	205	190	205	220	210	220	215	210	260	245	215	245	285	275
10	270	280	280	295	255	275	230	225	215	220	225	215	215	190	190	230	215	I A 210	240	215	240	245	250	250
11	265	255	260	250	230	215	245	225	200	195	H 195	230	205	220	215	H 210	215	260	I A 230	I A 220	215	A	A	A
12	I A 330	320	280	245	235	290	235	I A 230	205	I A 235	215	I B 230	B 235	215	I B 220	215	215	220	250	230	220	245	260	260
13	265	280	295	295	290	240	240	215	205	205	195	200	215	240	230	220	200	240	230	215	240	255	255	290
14	255	275	280	290	265	250	250	205	205	215	215	205	230	240	230	220	200	205	250	230	215	240	240	330
15	300	270	295	295	260	250	255	215	200	H 190	205	230	200	H 180	230	240	210	215	220	245	245	210	255	295
16	320	295	290	230	210	250	290	215	205	210	200	240	220	220	215	230	215	210	I A 250	230	280	215	A	295
17	B 300	295	280	245	245	250	250	215	210	I A 210	205	230	210	205	230	H 205	230	230	210	240	245	235	220	340
18	290	255	255	215	250	255	215	205	200	200	210	225	225	215	230	220	205	200	230	220	240	290	215	270
19	300	270	275	250	210	215	270	215	220	225	220	I A 215	I A 220	220	225	240	215	195	215	225	245	245	245	280
20	310	295	295	285	315	290	250	205	215	235	230	245	I A 230	235	245	220	210	220	215	240	245	265	265	295
21	I A 300	300	295	270	265	A 270	230	245	230	230	220	225	220	H 200	235	225	H 200	250	240	235	230	245	310	300
22	330	300	300	250	230	255	290	240	235	235	240	H 205	225	210	200	200	205	260	I A 235	I A 250	245	250	295	305
23	315	295	290	235	250	I A 260	285	230	215	230	H 195	215	215	230	215	230	200	I A 210	230	295	240	255	295	300
24	275	290	290	245	250	270	250	215	215	H 180	H 185	235	235	235	210	210	210	H 200	245	225	245	230	295	330
25	300	290	280	255	220	210	260	225	210	220	220	220	210	220	235	H 205	210	195	295	205	210	E S 300	315	300
26	300	295	290	225	190	I A 185	A	210	210	215	205	195	H 195	H 195	235	235	210	205	215	230	215	E S 240	E B 330	295
27	300	310	285	270	260	215	265	225	210	H 180	H 180	245	235	215	200	220	200	280	290	245	235	235	255	340
28	310	300	295	240	245	220	240	215	200	205	215	240	205	220	205	220	210	195	I B 255	225	H 210	280	260	290
29	290	300	305	275	225	225	250	220	210	H 205	235	I A 235	240	I A 220	225	245	205	210	230	250	255	250	290	I B 300
30	210	290	285	270	245	270	190	225	215	225	I A 215	I A 220	205	205	230	225	230	190	245	265	225	290	280	280
31	240	230	260	255	265	250	235	195	205	H 180	240	200	I A 220	240	215	205	205	195	240	235	230	250	300	310
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	30	29	29	29	29	30	30	30	31	31	31	31	31	30	30	31	30	29	30
MED	290	290	285	255	250	255	250	215	210	215	210	220	220	220	225	220	210	215	242	235	240	245	275	295
UQ	300	295	292	275	265	270	255	225	215	230	220	235	230	230	232	230	215	235	255	245	245	252	295	305
LQ	268	270	278	245	230	240	235	215	205	205	200	205	205	205	215	215	205	202	230	225	215	235	255	280

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DEC. 1973 | H'F (KM)

IONOSPHERIC DATA

DEC. 1973 | H'ES (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S	S	100	100	S	S	S	B	115	G	G	G	105	G	G	G	B	100	105	S	S	120	S	S
2	S	110	S	110	105	105	S	S	G	100	100	G	G	G	G	130	115	110	105	100	100	S	S	S
3	B	S	S	105	S	S	S	B	110	105	105	105	G	G	G	G	100	100	S	S	S	S	S	105
4	105	S	100	S	125	115	S	G	G	G	G	G	G	105	G	G	105	100	100	100	110	110	105	105
5	105	120	115	115	S	S	140	115	115	115	115	115	115	110	G	G	G	165	120	105	105	100	100	100
6	S	S	100	100	S	S	110	B	G	G	G	G	105	G	100	100	100	100	100	100	100	S	S	S
7	100	100	100	S	100	105	105	100	100	105	G	G	110	110	110	105	110	105	110	105	105	105	105	105
8	S	110	S	100	C	C	C	C	C	C	120	115	G	G	100	105	105	105	S	S	105	100	100	100
9	100	100	100	S	S	S	S	130	130	135	G	G	155	100	G	G	B	S	S	100	S	100	B	105
10	S	S	S	S	S	S	S	140	130	110	G	G	G	G	G	150	105	105	S	S	110	105	110	105
11	S	110	110	S	105	S	S	105	105	140	G	135	115	100	G	120	B	110	100	100	105	100	100	100
12	100	100	S	100	100	S	S	105	105	105	B	B	B	B	B	B	B	S	S	S	S	S	105	S
13	100	100	100	100	100	S	S	B	G	105	B	G	G	G	G	G	100	S	S	100	S	100	100	100
14	S	S	100	100	S	S	S	B	130	120	G	G	G	G	G	G	S	100	S	S	S	S	S	S
15	S	100	S	S	S	S	S	B	G	G	165	G	100	G	105	G	B	B	S	B	B	S	S	S
16	S	S	S	S	S	S	S	150	140	140	G	G	100	G	G	G	B	100	110	105	105	S	100	S
17	B	S	100	S	S	110	S	B	G	115	G	G	G	G	G	G	B	S	S	S	S	S	S	S
18	S	110	110	S	S	S	S	B	120	G	150	155	145	G	115	140	G	S	S	100	S	B	S	S
19	S	S	S	S	S	100	S	150	130	140	140	125	120	G	150	160	150	100	100	S	S	S	S	S
20	S	S	100	105	S	S	S	B	G	155	140	145	115	140	G	G	G	S	S	S	S	105	105	110
21	105	105	120	115	115	110	S	B	150	155	135	105	100	125	135	G	100	S	110	110	110	S	B	S
22	S	S	S	110	110	S	S	155	155	G	135	125	125	G	120	G	105	105	100	100	S	S	S	S
23	S	S	S	105	110	105	100	105	G	G	G	G	G	135	G	130	115	105	105	B	B	S	S	100
24	100	100	S	S	S	S	S	B	G	G	G	150	G	145	140	125	B	S	S	S	S	S	110	110
25	S	110	S	S	B	S	S	B	150	G	120	120	110	110	G	G	G	S	S	S	S	S	S	S
26	S	S	S	110	S	100	105	100	100	G	G	125	120	115	115	110	100	105	S	S	S	S	B	S
27	120	S	S	S	S	S	S	S	G	G	G	150	125	G	G	G	B	B	S	135	S	S	S	S
28	S	115	110	110	105	B	105	S	G	130	130	G	G	G	G	G	120	B	B	S	S	S	S	B
29	S	105	S	S	105	S	S	S	G	G	100	120	115	125	G	G	B	S	S	S	S	S	S	B
30	S	S	100	105	S	S	S	S	G	145	120	120	115	G	G	G	G	B	S	S	S	S	S	S
31	S	S	S	S	S	S	S	S	G	G	115	110	105	110	140	G	B	S	115	115	110	110	110	105
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	9	15	15	16	11	8	6	11	16	17	15	16	19	13	11	11	14	16	13	14	11	11	12	13
MED	100	105	100	105	105	105	105	115	125	120	120	122	115	110	115	125	105	105	105	100	105	105	105	105
UQ	105	110	110	110	110	110	110	145	135	140	138	140	120	125	138	135	115	105	110	105	110	108	108	105
LQ	100	100	100	100	102	102	105	105	108	105	115	115	105	110	108	108	100	100	100	100	105	100	100	100

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DEC. 1973 | H'ES (KM)

IONOSPHERIC DATA

DEC. 1973 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' 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			F 1	F 1					C 2				L 1					F 2	F 1			F 1		
2		F 2		F 2	F 1	F 2				L 2	L 1					H 2	C 3	F 3	F 3	F 2	F 2			
3				F 1					C 2	L 1	L 1	L 2					L 1	F 1						F 1
4	F 1		F 1		F 1	F 1								L 1			L 1	F 3	F 1	F 1	F 1	F 2	F 2	F 1
5	F 1	F 2	F 2	F 3			F 2	C 3	C 2	C 2	C 2	C 2	C 2	L 1				F 1	F 1	F 2	F 1	F 2	F 1	F 1
6			F 1	F 1			F 1						L 2		L 2	L 2	L 1	F 1	F 1	F 1	F 1			
7	F 1	F 1	F 1		F 1	F 1	F 1	L 1	L 1	L 1			L 1	L 3	L 2	L 2	L 2	F 1	F 1	F 2	F 2	F 2	F 1	F 1
8		F 1		F 1							C 2	C 2			L 1	L 2	L 1	F 1			F 1	F 2	F 2	F 1
9	F 1	F 1	F 1					H 1	H 2	H 1			H 1	L 1						F 1		F 1		F 2
10								H 1	H 2	L 2						HL 11	L 1	F 1			F 2	F 2	F 2	F 2
11		F 2	F 1		F 1			L 1	L 2	H 1		H 1	C 1	L 1		C 1		F 2	F 4	F 3	F 1	F 2	F 2	F 2
12	F 2	F 1		F 1	F 1			L 2	L 1	L 1													F 1	
13	F 1	F 1	F 2	F 2	F 1					L 1							L 1			F 1		F 1	F 1	F 1
14			F 1	F 1					H 1	C 1								F 1						
15		F 1									H 1		L 1		L 1									
16								H 1	H 1	H 1			L 1					F 1	F 2	F 2	F 2		F 1	
17			F 1			F 1				C 2														
18		F 1	F 1						C 1		H 1	H 2	H 1		C 2	H 2				F 1				
19						F 1		H 1	H 2	H 1	H 1	H 2	C 1		H 1	H 2	H 1	F 1	F 1					
20			F 1	F 2						H 1	H 1	H 1	C 2	H 2								F 2	F 2	F 2
21	F 3	F 2	F 2	F 2	F 2	F 2			H 2	H 1	H 2	L 1	L 2	H 1	HL 11		L 1		F 1	F 1	F 1			
22				F 1	F 2			H 1	H 1		H 1	H 1	H 1		C 1		L 1	F 2	F 2	F 2				
23				F 2	F 1	F 3	F 2	L 1						H 1		H 2	C 2	F 2	F 2					F 1
24	F 1	F 1										H 1		H 1	H 1	H 2							F 1	F 1
25		F 1							H 1		H 1	H 2	L 2	L 1										
26				F 1		F 3	F 2	L 2	L 2			H 1	H 1	C 1	C 1	L 1	L 1	F 1						
27	F 1											H 1	H 1							F 1				
28		F 1	F 1	F 1	F 2		F 1			H 1	H 1						C 1							
29		F 1			F 1						L 1	L 2	C 1	H 1										
30			F 1	F 1						H 2	H 1	H 1	C 1											
31											C 2	L 1	L 2	L 2	H 1				F 2	F 2	F 2	F 1	F 1	F 2
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

The Radio Research Laboratories, Japan

DEC. 1973 | TYPES OF ES

IONOSPHERIC DATA

DEC. 1973 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N. Long. 139 29.3 E Sweep 1 MHz to 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	32	I A 31	32	31	30	30	35	U R 69	65	67	84	81	R 96	J R 77	67	56	57	37	37	41	41	F 29	26	30
2	A	31	U F 31	34	34	31	34	59	R 66	75	R	69	71	60	69	66	54	54	36	31	32	26	25	27
3	30	30	F 29	F 29	29	29	30	60	70	59	I R 63	61	J R 74	71	56	61	48	33	31	30	35	23	26	30
4	28	28	31	32	31	29	31	J R 58	70	66	66	68	71	67	61	58	65	46	40	38	R	25	28	I A 29
5	31	I A 30	I A 30	26	27	26	J R 40	46	48	R	108	J R 105	J R 75	71	65	67	59	41	J R 40	49	F	33	30	35
6	36	F	35	35	30	39	47	R	J R 54	60	68	99	81	72	J R 76	60	I R 50	50	36	J R 40	34	31	26	F
7	F	28	29	30	J R 25	19	21	48	I R 59	56	66	67	66	57	55	57	H 48	40	25	31	38	26	26	I A 28
8	29	30	29	29	31	21	24	50	66	70	65	70	R 66	61	70	52	46	35	31	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	73	65	J R 77	72	61	56	62	51	31	23	35	38	F	F	F
11	30	30	31	31	33	31	U R 23	46	U R 65	67	R	J R 72	75	69	61	55	43	41	33	I R 33	36	23	J R 25	26
12	27	28	28	29	28	25	A	46	58	50	52	61	93	J R 70	55	52	47	33	26	30	33	26	29	I R 30
13	31	31	31	31	31	31	26	47	58	U R 56	64	64	63	59	69	57	55	31	26	26	27	27	30	30
14	31	30	30	30	30	28	24	50	55	66	55	66	66	74	87	56	47	32	31	28	30	25	24	C
15	F 28	C	C	C	C	C	C	C	C	C	65	J R 74	65	64	62	61	56	37	36	35	34	36	32	29
16	30	30	31	34	26	20	23	51	58	55	58	65	74	71	R 62	61	60	40	31	37	31	30	24	27
17	27	26	29	30	26	27	24	50	61	61	64	73	85	66	69	52	52	58	44	31	F 32	33	30	23
18	27	31	30	33	27	F 28	29	50	59	I R 60	J R 59	65	J R 75	66	76	66	51	39	35	36	24	J R 29	25	28
19	27	28	I R 31	J R 29	25	20	R 27	48	58	71	56	I R 59	61	64	66	J R 57	63	48	29	31	31	J R 31	26	27
20	28	29	31	31	28	29	28	J R 52	59	60	70	71	86	81	66	66	56	37	44	35	29	J R 32	30	A
21	30	31	34	32	32	30	23	49	R	65	80	70	R 66	I A 82	J R 77	61	51	39	49	45	31	24	S 28	30
22	30	J F 32	F 30	J S 40	25	24	20	41	57	R 69	81	72	R 90	84	72	56	52	43	J R 60	F 34	26	24	24	F 26
23	27	30	30	35	25	24	26	49	R	66	R 68	U R 68	J R 81	R	62	U R 66	62	39	32	29	34	29	28	29
24	30	29	30	31	31	26	26	48	56	R 64	71	78	70	69	69	59	53	38	34	30	24	30	25	26
25	F 29	30	30	32	32	21	20	46	66	R 65	66	66	R 83	78	J R 77	71	61	47	28	42	30	21	25	F
26	J R 29	F	F	R	R	18	21	J R 42	56	56	I R 59	R	65	J R 71	61	58	56	41	38	28	30	24	22	25
27	26	28	28	30	35	26	21	44	51	51	61	81	J R 76	77	53	J R 59	56	36	26	28	34	26	25	23
28	25	26	J R 29	31	31	24	25	41	56	53	68	64	73	67	56	76	52	40	A	34	28	29	24	26
29	27	29	28	30	34	26	25	44	50	56	62	J R 72	65	71	74	61	64	49	41	26	29	29	26	25
30	88	29	29	31	32	25	28	46	55	R 56	68	R 71	J R 74	64	74	70	54	44	29	32	32	26	29	29
31	27	25	24	29	26	29	31	41	41	52	64	J R 80	70	85	72	66	56	43	40	40	I A 36	F 21	24	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	27	26	27	27	27	28	27	27	26	28	28	29	30	29	30	30	30	30	29	29	27	28	28	24
MED	29	30	30	31	30	26	26	48	58	60	65	70	74	70	66	60	54	40	34	33	32	26	26	28
UQ	30	30	31	32	32	29	30	50	65	66	68	74	R 81	74	72	66	57	44	40	37	34	30	28	30
LQ	27	28	29	30	26	24	23	46	55	56	62	66	66	64	61	57	51	37	29	30	30	24	25	26

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DEC. 1973 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 FOF1 (0.01 MHZ)

135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 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 410	L									
2										L	L	L	L	L	L	L								
3								L 210	L	L	L	L	L	L										
4								L		L	L	L	L	L	L	L								
5										A	L	A	A	L	L									
6											L	L		L	L									
7										L	L	L	L		L									
8										L	L	L 400	L	L	L									
9									C	C	C	C	C	C	C	C								
10									C	C	L	L	L	L	L	L								
11										L	L	L	L	L	L									
12											L	L	L											
13									L	L		L	L	L	L	L								
14										U L 400	L	L	L	L 450	L	L								
15									C	C	L 400	370	L	L	L									
16										L	L 400	L	L	L	L	L								
17										L	L	L	L	L	L	L								
18											L	L 450	L	L	L	L								
19										L	L	L	L	L	L									
20											L	L	L	420	L	L								
21												L	L	A	L	L								
22										L	L 420	L	L	L 410	L	L								
23										L	L	L	L	L	L									
24									L 270	L	L	L	L	L	L									
25										L	L	L	L	L 410	L	L								
26										L		L	L		L									
27										L	L	L	L	L	L	L								
28									L		L	L	L	L	L	L								
29											L	L	L	L	L	L								
30										L	L	L	L	L	L 390	L								
31										L	L 430	L	L 410	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	1	4	3	1	5	1									
MED								L 210	L 270	U L 400	L 410	L 400	L 410	L 410	L 390									
UQ											L 425	L 425		L 420										
LQ											L 400	385		L 410										

The Radio Research Laboratories, Japan

DEC. 1973 FOF1 (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 FOE (0.01 MHZ) 135 E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N. Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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	A	A	320	320	310	275	250	195							
2								170	255	A	310	325	325	320	275	250	190							
3								A	260	270	300	310	A	A	I A 245	230	160							
4								A	240	270	A	I A 295	290	295	260	225	B							
5								180	A	I A 275	300	295	285	A	A	A	B							
6								A	R	R	R	A	A	A	A	A								
7								B	I R 220	255	295	I A 300	A	A	A	A	A							
8								A	225	265	290	R 305	I A 300	295	260	210	175							
9								C	C	C	C	C	C	C	C	C	C							
10								C	C	C	A	A	A	275	R	225	B							
11								A	A	265	I A 280	295	A	A	A	A	A							
12								B	245	B	A	B	B	A	A	A	B							
13								B	R	R	300	300	305	285	270	I A 235	165							
14								175	A	280	295	305	305	300	270	225	B							
15								C	C	C	280	305	310	280	260	230	A							
16								A	225	275	I A 290	310	310	290	280	250	170							
17								180	225	270	I A 290	310	320	305	275	240	170							
18								170	260	I A 270	I R 290	300	I R 300	290	280	A	190							
19								150	250	I A 275	300	300	I A 310	295	280	R	170							
20								B	220	275	295	315	A	290	270	260	205							
21								190	220	280	300	I A 310	305	280	270	245	A							
22								200	240	270	310	A	A	A	A	240	170							
23								A	R	A	295	325	305	I R 295	290	230	170							
24								175	220	280	300	320	315	290	265	245	190							
25								180	240	280	300	295	A	R	290	250	160							
26								B	R	260	I B 285	I A 290	290	I A 290	I A 290	R	R							
27								B	R	R	R	320	310	I A 295	280	R	B							
28								B	210	280	280	305	I R 305	300	270	255	A							
29								175	240	265	300	300	A	A	I A 280	I A 250	175							
30								170	R 220	270	280	290	310	I R 290	270	250	A							
31								175	210	260	A	310	A	275	275	I A 250	175							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								13	19	21	23	26	19	21	23	21	16							
MED								175	225	270	295	305	305	290	275	245	172							
UQ								180	242	275	300	310	310	295	280	250	190							
LQ								170	220	265	290	300	302	290	270	230	170							

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DEC. 1973 FOE (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOES (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N. Long. 139 29.3 E Sweep 1 MHz to 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	J X 25	J X 33	J X 29	J X 23	J X 19	E B 12	J X 19	J X 22	J X 25	J X 31	J X 31	G 31	J G 30	J G 30	J X 29	G	G 18	J X 23	J X 19	M 21	J X 25	E B 13	E S 15	M 20
2	J X 44	J X 20	E B 14	E B 13	J X 18	J X 17	19	G	G	33	J X 30	G 30	G 32	G	G	G	24	17	24	J X 19	E S 15	E B 12	E B 12	E S 15
3	E S 15	J X 19	M 20	E B 12	E B 14	E B 12	E S 15	16	G 24	G	G 28	G	48	40	33	G 21	G	J X 20	20	J X 20	E S 15	E S 15	E S 15	J X 26
4	20	20	E S 15	18	20	20	E S 15	25	J G 21	G 25	35	35	J G 25	J G 24	G	G	E B 15	E S 15	E S 15	E S 15	E B 12	E S 15	J X 21	50
5	J X 20	40	J X 40	J X 26	25	E B 13	E S 15	G	30	J X 70	34	J X 60	J X 44	31	32	J X 29	E B 15	25	20	J X 26	J X 24	20	J X 21	J X 41
6	J X 23	19	J X 20	21	20	22	J X 20	J X 20	G	G	G	34	J X 49	J X 31	J X 31	J X 40	J X 54	J X 30	J X 20	21	20	19	20	21
7	E S 15	E S 15	E S 15	21	18	E B 13	21	J X 26	J G 25	G	J X 30	J X 30	32	J X 36	29	25	18	J X 24	J X 19	M 19	J X 25	J X 30	J X 25	M 35
8	J X 25	J X 25	J X 24	20	M 20	17	19	21	29	29	G	G	30	G	J X 30	J X 30	20	19	E S 15	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	E C 46	J X 32	35	J X 31	G 23	G 24	G 19	20	20	E B 13	19	E S 15	20	20	E S 15
11	J X 24	J X 24	J X 30	J X 25	20	J X 20	J X 20	J X 20	42	J X 24	J X 41	J G 28	35	33	J X 30	J X 31	J X 29	J X 26	J X 24	20	E S 15	J X 30	J X 25	J X 22
12	26	E S 15	E S 15	E S 15	21	21	J X 54	E B 15	G	E B 32	32	E B 33	E B 35	J X 41	J X 41	32	E B 23	E B 13	25	E S 15	E S 15	E S 15	E B 13	E S 15
13	E S 15	E S 15	J X 24	J X 25	E B 13	E B 13	E S 15	E B 15	G	G	33	G 25	G 25	G 22	30	J X 30	G	E S 15	M 21	J X 20	M 20	M 20	J X 17	E B 12
14	E B 13	E B 12	E B 13	E B 13	E B 14	E B 14	M 18	G	J X 28	32	G	G	G	G	G	26	20	E S 15	E B 13	E B 13	E S 15	E S 15	E B 14	C
15	E S 15	C	C	C	C	C	C	C	C	C	33	G 21	J G 23	32	G 19	G 22	J X 25	J X 24	E B 13	E B 12	E S 15	E S 15	E B 12	E S 15
16	E B 12	E B 14	E S 15	E B 12	18	E B 12	M 21	21	G	J G 26	J X 31	G 31	G	32	G	G	23	M 20	M 20	J X 25	J X 20	J X 24	M 23	19
17	J X 19	M 24	M 20	E S 15	J X 19	E B 13	E S 15	G	G	G	J X 31	J G 29	G	G	G 19	G 20	G	M 17	E B 12	E B 12	E B 13	E S 15	E B 12	E S 15
18	E S 15	E B 12	E B 13	M 20	E S 15	E S 15	E B 13	G	G	33	G	G	G	G	G 25	30	G 17	J X 20	E B 13	E S 15	E S 15	E S 15	E S 15	E S 15
19	E S 15	E S 15	E S 15	E S 15	E B 13	E S 15	E S 15	G	G 22	31	35	37	33	G 28	G 22	G	G	20	19	E B 13	E B 13	E S 15	E S 15	E S 15
20	E S 15	20	E S 15	E S 15	E S 15	20	J X 20	E B 16	G	31	36	G	32	G	G	G	G	M 25	M 23	E S 15	E S 15	E S 15	M 21	M 28
21	J X 24	M 21	17	19	M 21	J X 25	22	G	G	41	38	37	37	M 82	30	32	J X 30	J X 19	M 19	17	E S 15	M 22	E S 15	E S 15
22	E B 14	E B 14	E B 13	E S 15	E S 15	E B 14	E S 15	G	G	33	G	43	J X 54	J X 40	J X 36	G 21	19	M 23	J X 23	M 20	M 20	E S 15	E S 15	E S 15
23	E B 14	E S 15	E S 15	E B 14	E S 15	20	J X 24	22	J X 25	J X 30	J G 25	G	G	G	32	37	G	E S 18	E S 15	E S 15	J X 25	21	M 22	24
24	M 21	M 21	E S 15	16	E B 14	E S 15	M 22	G	G	G 23	32	33	34	33	33	30	G	E B 14	E B 13	E B 12	E B 14	18	E S 15	M 25
25	17	E B 12	E B 12	17	E B 12	E S 15	E S 15	G	26	G	G	38	36	G	32	G	G	E S 15	E B 13	E S 15	E S 15	E S 15	E B 14	E S 15
26	E S 15	E S 15	E S 15	E B 13	E S 15	E S 15	E S 15	E B 15	G 20	G	E B 30	36	33	35	G	G	G	E S 15	E S 15	E S 15	E S 15	E B 13	E B 13	E S 15
27	E B 13	E S 15	E S 15	E S 15	E B 13	E S 15	E S 15	G	G	G	G	36	36	J X 41	36	G	E B 15	E S 15	J X 20	E S 15	E S 15	E B 13	E B 13	E B 13
28	E S 15	E S 15	J X 24	J X 20	J X 20	21	19	E B 14	G	31	32	35	G	G	G 25	29	J X 28	J X 31	M 35	24	25	M 20	18	J X 18
29	E S 15	E B 13	E B 13	20	M 21	M 20	M 20	G	G	31	G	36	J X 40	35	31	G	G	E B 12	17	M 21	E B 12	E B 14	E S 15	E B 12
30	E B 12	E S 15	E S 15	M 20	M 21	M 20	E B 13	G	G	G	J X 41	31	G	G	G	G 19	J X 24	E B 14	E S 16	E B 13	M 20	M 21	M 21	E S 15
31	E B 14	E B 14	E B 13	E B 12	E B 13	E B 13	E B 14	G	G	31	J X 31	G 29	35	G	30	J X 30	30	17	E B 12	J X 54	M 37	J X 25	E S 15	J X 30
	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	28	28	28	28	28	28	28	29	30	30	30	30	30	30	30	30	30	29	29	29	29	28
MED	E 15	E 15	E 15	16	18	E 15	18	E G 14	G	U 28	31	31	32	G 29	30	G 22	18	19	19	17	E 15	E 15	E 15	E 15
UQ	J X 21	20	20	20	20	20	20	20	25	32	33	36	36	35	32	30	24	J X 23	20	20	20	20	21	24
LQ	E S 15	E E 14	E E 14	E E 14	E B 14	E B 13	E S 15	G	G	G	G	G 25	G 23	G	G 19	G	G	E E 15	E B 13	E S 15	E S 15	E S 15	E B 14	E S 15

The Radio Research Laboratories, Japan

DEC. 1973 | FOES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FBES (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N. Long. 139 29.3 E Sweep 1 MHz to 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	16	A	27	19	E	E B 12	E	18	25	29	31	G 29	G 30	G 27	26	G	G 16	17	16	E	E	E B 13	E S 15	E
2	A	E	E B 14	E B 13	E	E	E	G	G	32	26	G 27	G 26	G	G	G	24	16	E	E	E S 15	E B 12	E B 12	E S 15
3	E S 15	E	E	E B 12	E B 14	E B 12	E S 15	16	G 21	G	G 28	G	40	38	23	G 19	G	E	E	18	E S 15	E S 15	E S 15	16
4	E	E	E S 15	E	E	E	E S 15	18	G 20	G 24	31	31	G 24	G 22	G	G	E B 15	E S 15	E S 15	E S 15	E B 12	E S 15	16	A
5	E	A	A	16	E	E B 13	E S 15	G	29	69	34	59	41	31	28	25	E B 15	E	E	18	20	16	16	21
6	18	E	16	E	E	E	E	18	G	G	G	34	40	31	24	31	39	25	E	18	E	E	E	E
7	E S 15	E S 15	E S 15	E	E	E B 13	E	19	G	G	25	30	32	35	28	25	16	E	E	E	E	E	E	A
8	20	17	E	E	E	E	E	21	29	29	G	G	30	G	22	20	16	E	E S 15	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	E C 46	33	33	31	G 23	G 18	G 17	18	E	E B 13	E	E S 15	E	E	E S 15
11	16	20	E	E	E	E	17	20	39	21	30	G 28	34	30	29	25	24	15	E	E	E S 15	17	15	E
12	E	E S 15	E S 15	E S 15	E	E	A	E B 15	G	E B 32	30	E B 33	E B 35	41	38	32	E B 23	E B 13	E	E S 15	E S 15	E S 15	E B 13	E S 15
13	E S 15	E S 15	E	16	E B 13	E B 13	E S 15	E B 15	G	G	33	G 25	G 25	G 22	29	26	G	E S 15	E	E	E	E	E	E B 12
14	E B 13	E B 12	E B 13	E B 13	E B 14	E B 14	E	G	26	31	G	G	G	G	G	25	19	E S 15	E B 13	E B 13	E S 15	E S 15	E B 14	C
15	E S 15	C	C	C	C	C	C	C	C	C	32	G 21	G 22	32	G 19	G 19	21	16	E B 13	E B 12	E S 15	E S 15	E B 12	E S 15
16	E B 12	E B 14	E S 15	E B 12	E	E B 12	E	20	G	G 24	31	G 26	G	32	G	G	23	E	E	E	E	E	E	E
17	E	E	E	E S 15	E	E B 13	E S 15	G	G	G	31	G 24	G	G	G 19	G 19	G	E	E B 12	E B 12	E B 13	E S 15	E B 12	E S 15
18	E S 15	E B 12	E B 13	E	E	E S 15	E S 15	E B 13	G	290	G	G	G	G	G 21	20	G 16	20	E B 13	E S 15	E S 15	E S 15	E S 15	E S 15
19	E S 15	E S 15	E S 15	E S 15	E B 13	E S 15	E S 15	G	G 19	30	32	36	31	G 26	G 19	G	G	E	E	E B 13	E B 13	E S 15	E S 15	E S 15
20	E S 15	E	E S 15	E S 15	E S 15	E	E	E B 16	G	30	35	G	32	G	G	G	G	19	17	E S 15	E S 15	E S 15	E	A
21	E	E	E	E	E	E	E	G	G	38	38	36	37	A	E R 30	27	26	E	E	E	E S 15	E	E S 15	E S 15
22	E B 14	E B 14	E B 13	E S 15	E S 15	E B 14	E S 15	G	G	32	G	35	40	34	26	G 20	16	E	16	E	E	E S 15	E S 15	E S 15
23	E B 14	E S 15	E S 15	E B 14	E S 15	E	E	18	19	29	G 22	G	G	G	31	33	G	E S 18	E S 15	E S 15	17	E	16	E
24	E	17	E S 15	E	E B 14	E S 15	E	G	G	G 23	32	33	34	32	32	26	G	E B 14	E B 13	E B 12	E B 14	17	E S 15	E
25	E	E B 12	E B 12	E	E B 12	E S 15	E S 15	G	26	G	G	35	35	G	31	G	G	E S 15	E B 13	E S 15	E S 15	E S 15	E B 14	E S 15
26	E S 15	E S 15	E S 15	E B 13	E S 15	E S 15	E S 15	E B 15	E R 20	G	E B 30	32	32	E R 35	G	G	G	E S 15	E S 15	E S 15	E S 15	E B 13	E B 13	E S 15
27	E B 13	E S 15	E S 15	E S 15	E B 13	E S 15	E S 15	G	G	G	G	35	35	40	31	G	E B 15	E S 15	E	E S 15	E S 15	E B 13	E B 13	E B 13
28	E S 15	E S 15	E	18	18	E	E	E B 14	G	31	32	34	G	G	G 24	28	22	26	A	18	16	E	E	E
29	E S 15	E B 13	E B 13	E	E	E	E	G	G	E R 31	G	35	37	35	28	G	G	E B 12	E	E	E B 12	E B 14	E S 15	E B 12
30	E B 12	E S 15	E S 15	E	E	E	E B 13	G	G	G	33	30	G	G	G	G 18	22	E B 14	E S 16	E B 13	E	E	E	E S 15
31	E B 14	E B 14	E B 13	E B 12	E B 13	E B 13	E B 14	G	G	28	31	G 27	32	G	30	26	27	16	E B 12	22	A	15	E S 15	18
	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	28	28	28	28	28	28	27	29	30	30	30	30	30	30	30	30	30	29	29	29	29	28
MED	E 15	E E 14	E E 14	E E 12	E E 12	E E 12	E E 13	E G 14	G	U 26	30	30	32	G 25	24	G 20	16	E E 15	E E 12	E E 13	E 15	E 15	E E 14	E 15
UQ	E S 15	E S 15	E S 15	E 15	E B 14	E B 14	E S 15	18	20	30	32	34	35	33	29	26	22	16	E E 15	E S 15	E S 15	E S 15	E S 15	E S 15
LQ	E E 12	E E 12	E E 12	E	E	E	E	G	G	G	G	G 24	G 22	G	G 18	G	G	E	E	E	E E 12	E	E	E E 12

The Radio Research Laboratories, Japan

DEC. 1973 | FBES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 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	14	14	14	E S 15	14	12	12	12	14	15	16	18	15	15	14	14	14	12	E S 15	E S 15	14	13	E S 15	E S 15
2	12	14	14	13	13	14	13	14	12	15	14	15	15	16	15	14	16	17	18	19	E S 15	12	12	E S 15
3	E S 15	14	14	12	14	12	E S 15	13	14	15	16	16	13	13	15	15	14	E S 15	E S 15	13	E S 15	E S 15	E S 15	E S 15
4	E S 15	E S 15	E S 15	E S 15	13	E S 15	E S 15	18	14	15	25	16	15	15	14	14	15	E S 15	E S 15	E S 15	12	E S 15	12	E S 15
5	E S 15	E S 15	13	13	E S 15	13	E S 15	14	15	15	19	15	15	15	15	14	15	E S 15	13	E S 15	E S 15	E S 15	E S 15	14
6	E S 15	E S 15	E S 15	E S 15	13	E S 15	E S 15	13	16	15	16	15	14	14	14	14	13	14	13	E S 15	E S 15	E S 15	E S 15	E S 15
7	E S 15	E S 15	E S 15	E S 15	E S 15	13	E S 15	13	14	14	12	12	15	16	15	14	14	14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
8	13	14	13	12	12	14	E S 15	15	15	14	14	16	15	15	15	14	14	14	E S 15	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	E C 46	14	18	14	16	14	15	15	E S 15	13	13	E S 15	E S 15	E S 15	E S 15
11	13	13	E S 15	E S 15	13	E S 15	12	14	13	15	14	15	14	15	15	15	13	E S 15	E S 15	E S 15	E S 15	E S 15	13	E S 15
12	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	13	15	18	32	26	33	35	25	18	12	23	13	E S 15	E S 15	E S 15	E S 15	13	E S 15
13	E S 15	E S 15	E S 15	13	13	13	E S 15	15	15	15	15	16	15	15	14	14	15	E S 15	13	E S 15	E S 15	E S 15	13	12
14	13	12	13	13	14	14	E S 15	15	14	14	15	15	15	15	14	15	16	E S 15	13	13	E S 15	E S 15	14	C
15	E S 15	C	C	C	C	C	C	C	C	C	14	14	15	14	14	13	12	12	13	12	E S 15	E S 15	12	E S 15
16	12	14	E S 15	12	14	12	E S 15	13	12	15	15	18	14	15	15	15	14	14	E S 15	E S 15	14	14	E S 15	E S 15
17	E S 15	14	E S 15	E S 15	13	13	E S 15	14	13	15	14	14	14	15	14	12	15	13	12	12	13	E S 15	12	E S 15
18	E S 15	12	13	13	E S 15	E S 15	13	13	14	14	15	16	16	15	15	14	13	14	13	E S 15	E S 15	E S 15	E S 15	E S 15
19	E S 15	E S 15	E S 15	E S 15	13	E S 15	E S 15	14	14	15	15	16	15	15	15	15	16	E S 15	E S 15	13	13	E S 15	E S 15	E S 15
20	E S 15	13	E S 15	E S 15	E S 15	E S 15	E S 15	16	14	15	15	15	15	15	15	16	15	14	13	E S 15	E S 15	E S 15	E S 15	E S 15
21	12	E S 15	E S 15	E S 15	E S 15	12	E S 15	15	15	14	14	16	15	15	13	14	15	E S 15	13	E S 15	E S 15	14	E S 15	E S 15
22	14	14	13	E S 15	E S 15	14	E S 15	15	15	15	15	15	15	15	15	15	15	E S 15	12	E S 15	14	E S 15	E S 15	E S 15
23	14	E S 15	E S 15	14	E S 15	E S 15	E S 15	14	14	15	14	16	18	16	15	18	15	E S 18	E S 15	E S 15	E S 15	E S 15	12	E S 15
24	14	12	E S 15	12	14	E S 15	14	15	14	14	16	15	14	15	13	15	15	14	13	12	14	E S 15	E S 15	E S 15
25	14	12	12	13	12	E S 15	E S 15	12	14	15	15	16	15	15	16	14	13	E S 15	13	E S 15	E S 15	E S 15	14	E S 15
26	E S 15	E S 15	E S 15	13	E S 15	E S 15	E S 15	15	13	16	30	18	18	18	16	16	15	E S 15	E S 15	E S 15	E S 15	13	13	E S 15
27	13	E S 15	E S 15	E S 15	13	E S 15	E S 15	14	15	15	16	16	15	15	15	17	15	E S 15	E S 15	E S 15	E S 15	13	13	13
28	E S 15	E S 15	E S 15	13	12	E S 15	E S 15	14	16	16	15	25	15	15	15	14	14	14	14	E S 15	E S 15	E S 15	E S 15	E S 15
29	E S 15	13	13	E S 15	E S 15	13	E S 15	13	14	15	15	15	21	18	15	15	15	12	14	13	12	14	E S 15	12
30	12	E S 15	E S 15	E S 15	14	13	13	12	14	15	12	15	16	14	15	14	12	14	E S 16	13	12	14	14	E S 15
31	14	14	13	12	13	13	14	12	15	12	15	15	22	15	15	15	16	13	12	13	14	12	E S 15	12
	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	28	28	28	28	28	28	28	29	30	30	30	30	30	30	30	30	30	29	29	29	29	28
MED	E S 15	13	E S 15	13	14	13	E S 15	14	14	15	15	16	15	15	15	14	15	13	13	E S 15	E S 15	E S 15	E S 15	E S 15
UQ	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	15	15	15	16	16	15	15	15	15	15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
LQ	13	14	13	13	13	13	13	13	14	15	14	15	15	15	14	14	14	14	13	12	13	13	13	E S 15

The Radio Research Laboratories, Japan

DEC. 1973 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F2 (0.01) | 135 E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N. Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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	285	A	285	295	300	280	305	U R 340	350	355	330	340	R 325	J R 325	335	360	370	320	295	310	315	F 315	270	280
2	A	285	U F 270	280	290	295	310	355	R 360	320	R	320	340	315	340	350	355	350	320	305	320	330	305	285
3	285	295	F 280	F 270	280	270	305	350	360	365	I R 335	345	J R 335	365	340	360	355	335	325	305	315	310	285	320
4	290	290	310	290	325	280	310	J R 315	360	355	335	325	330	345	330	330	340	350	305	315	R	305	295	I A 300
5	295	I A 295	I A 305	275	300	255	J R 375	370	315	R	325	J R 345	J R 350	355	340	330	360	320	J R 300	310	F	335	270	260
6	290	F	270	325	305	310	320	R	J R 355	335	325	335	335	365	J R 355	320	I R 335	320	310	J R 330	325	330	300	F
7	F	285	310	335	J R 360	280	305	355	I R 355	365	360	360	365	360	345	370	H 335	325	345	320	330	310	310	I A 260
8	280	300	295	280	350	330	310	340	365	355	365	355	R 365	360	370	380	360	345	325	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	325	340	J R 350	360	345	325	355	375	360	350	315	320	F	F	F
11	305	335	295	295	310	360	U R 280	350	U R 280	360	R	J R 350	350	365	360	350	375	370	335	I R 315	365	325	J R 290	275
12	265	290	290	315	325	285	A	375	345	380	365	330	365	J R 345	365	365	350	335	315	305	305	310	280	I R 300
13	295	295	295	295	295	325	345	365	370	U R 345	345	345	350	360	335	350	335	340	340	310	335	295	300	300
14	305	285	305	290	320	340	290	370	375	335	325	340	335	305	360	375	380	315	335	325	315	320	335	C
15	F 290	C	C	C	C	C	C	C	C	C	330	J R 360	315	345	350	350	355	325	320	310	335	335	310	260
16	270	295	295	340	310	335	285	355	375	365	380	350	340	340	R 340	360	365	350	310	350	335	325	290	295
17	290	305	280	315	325	335	295	340	375	380	325	335	360	340	360	350	335	355	340	345	F 310	335	330	325
18	280	295	330	315	310	F 320	330	360	375	I R 355	J R 325	310	J R 355	350	345	350	380	310	345	335	375	J R 315	295	265
19	285	295	I R 275	J R 330	340	305	R 275	355	360	355	355	I R 335	345	345	335	J R 360	350	375	290	300	325	J R 300	310	290
20	270	280	290	325	290	290	325	J R 350	340	335	355	325	330	345	340	340	330	295	325	340	295	J R 295	320	A
21	265	290	280	295	295	300	285	315	R	340	340	325	R 325	I A 340	J R 340	365	375	310	305	355	350	295	S 270	280
22	255	J F 270	F 270	J S 325	355	265	305	345	335	R 335	330	335	R 310	370	350	355	380	295	J R 345	F 325	285	315	290	F 285
23	275	285	305	315	305	310	310	335	R	350	R 355	U R 340	J R 335	R	340	U R 340	370	335	315	310	295	305	375	375
24	300	375	280	310	305	270	310	345	360	R 350	330	335	315	345	345	375	345	320	310	305	315	335	280	275
25	F 265	280	300	330	355	305	320	335	350	R 335	350	350	R 360	320	J R 350	340	360	345	290	310	370	290	290	F
26	J R 260	F	F	R	R	380	290	J R 350	360	325	I R 350	R	325	J R 310	330	345	360	370	345	325	315	340	325	280
27	285	280	285	305	315	345	290	345	335	355	320	345	J R 340	350	340	J R 305	340	335	345	345	335	310	325	265
28	270	275	J R 280	355	355	300	285	345	375	330	340	330	330	345	365	305	365	350	A	295	320	340	290	285
29	280	280	280	295	325	310	305	340	360	360	340	J R 335	335	340	340	325	330	325	345	345	310	335	310	275
30	270	270	290	305	330	295	325	340	380	R 355	335	R 335	J R 325	330	335	335	370	380	310	320	315	285	275	275
31	310	300	290	290	330	285	355	365	370	380	325	J R 355	325	340	360	350	355	350	325	325	I A 335	F 285	280	285
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	25	27	27	27	28	27	27	26	28	28	29	30	29	30	30	30	30	29	29	27	28	28	24
MED	285	290	290	305	315	302	305	350	360	355	338	340	335	345	340	350	358	335	325	315	320	315	295	282
UQ	290	295	298	325	330	328	320	355	370	360	352	350	350	355	355	360	370	350	340	330	335	332	310	298
LQ	270	280	280	292	302	282	290	340	350	335	328	335	325	340	340	340	340	320	310	310	315	302	282	275

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DEC. 1973 | M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 370	L									
2										L	L	L	L	L	L	L								
3								L 400	L	L	L	L	L	L										
4								L		L	L	L	L	L	L	L								
5										A	L	A	A	L	L									
6											L	L		L	L									
7										L	L	L	L		L									
8										L	L	L 395	L	L	L									
9									C	C	C	C	C	C	C	C								
10									C	C	L	L	L	L	L	L								
11										L	L	L	L	L	L									
12											L	L	L											
13									L	L		200	L	L	L	L								
14										U L 350	L	L	L	L 355	L	L								
15									C	C	L 395	420	L	L	L									
16										L	L 375	L	L	L	L	L								
17										L	L	L	L	L	L	L								
18											L	L 360	L	L	L	L								
19										L	L	L	L	L	L									
20											L	L	L	L 380	L	L								
21												L	L	A	L	L								
22										L	L 355	L	L	L 385	L	L								
23										L	L	L	L	L	L									
24									L 400	L	L	L	L	L	L									
25										L	L	L	L	L 365	L	L								
26										L		L	L		L									
27										L	L	L	L	L	L	L								
28									L		L	L	L	L	L	L								
29											L	L	L	L	L	L								
30										L	L	L	L	L	L 360	L								
31										L	L 355	L	L 365	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	1	4	4	1	5	1									
MED								L 400	L 400	U L 350	L 365	378	L 365	L 370	L 360									
UQ											L 385	408		L 380										
LQ											L 355	280		L 365										

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DEC. 1973 | M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1973 | H'F2 (KM) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										240	260	230	270	250	230									
2										250	230	220	240	280	240	250								
3								240	220	230	240	240	250	230										
4								240		220	250	250	250	250	250									
5										A	270	240	250	250	250									
6											260	250		230	230									
7										220	240	230	240		230									
8										230	220	230	230	230	240									
9									C	C	C	C	C	C	C	C								
10									C	E C 240	240	240	220	240	250	250								
11										220	250	250	250	240	240									
12											240	260	250											
13									220	245			240	240	240	250								
14										260	230	240	250	290	230	215								
15									C	C	250	230	290	250	255									
16										230	220	225	270	250	250	240								
17										215	260	255	230	250	240	230								
18											240	210	250	250	250	240								
19										230	230	250	250	250	250									
20											230	260	260	240	230	220								
21												250	250	I A 260	230	220								
22										240	270	250	260	225	230	220								
23										230	225	230	250	230	240									
24									220	230	260	250	240	230	240									
25										240	245	245	250	295	230	245								
26										240		270	250		250									
27										240	320	270	250	250	240	250								
28									230		260	250	250	260	240	270								
29											250	260	250	250	240	250								
30											260	250	260	240	260	240								
31										220	270	240	280	260	230	230								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	4	20	27	29	29	27	28	16								
MED								240	220	230	250	250	250	250	240	240								
UQ									225	240	260	250	250	250	250	250								
LQ									220	225	235	230	250	240	230	225								

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DEC. 1973 | H'F2 (KM)

IONOSPHERIC DATA

DEC. 1973 | H'F (KM) | 135° E Mean Time (G. M. T.+ 9h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	300	A	E A 350	A 300	275	300	260	220	210	210	210	210	H 200	210	210	210	210	200	250	220	240	230	305	300
2	A	310	300	280	270	270	250	225	220	220	220	200	210	H 190	210	240	210	220	210	250	220	210	220	280
3	270	300	300	F 290	290	290	240	200	220	210	200	200	250	230	230	230	205	220	240	250	230	235	305	280
4	260	300	280	290	250	250	270	220	235	205	210	210	205	200	230	240	220	210	250	250	200	260	280	I A 300
5	270	I A 275	I A 275	305	290	340	240	220	290	I A 220	240	I A 230	I A 230	240	205	230	210	205	250	240	230	205	300	330
6	290	300	300	260	230	250	240	210	220	250	240	200	250	240	240	215	A 260	230	240	240	230	210	280	300
7	310	290	280	240	200	310	300	240	225	H 195	200	H 200	220	230	220	225	H 205	220	240	250	220	240	250	I A 340
8	A 340	280	260	280	210	240	250	230	240	220	205	190	200	220	245	210	210	200	210	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	200	220	220	200	205	200	205	240	200	240	240	230	300	300
11	290	300	280	280	240	195	210	230	230	210	200	220	210	230	210	210	205	200	240	250	210	290	300	340
12	300	300	290	240	250	290	A	210	240	240	210	240	250	240	230	230	220	200	240	250	240	255	260	270
13	250	290	290	290	300	240	200	215	220	205	220	240	200	230	220	220	210	230	220	245	220	270	250	280
14	245	270	270	270	250	225	260	210	220	225	210	200	200	220	H 220	220	200	205	220	220	210	240	220	C
15	300	C	C	C	C	C	C	C	C	C	210	190	H 195	240	245	220	220	205	240	220	240	220	230	300
16	320	305	290	220	220	220	300	220	210	200	200	205	H 170	230	205	240	220	200	250	210	210	240	290	290
17	300	300	300	260	240	230	260	230	210	220	190	190	230	205	220	220	220	205	220	210	240	245	220	240
18	300	260	220	210	245	250	220	205	210	230	205	205	260	240	200	230	200	220	230	210	205	230	250	290
19	305	290	290	240	200	300	280	220	220	230	205	230	210	230	240	240	220	200	290	240	240	240	250	290
20	320	310	300	250	310	300	250	230	220	230	240	220	H 210	205	230	220	205	200	240	210	250	270	220	A
21	330	300	280	290	280	250	310	250	230	230	250	220	230	I A 220	220	220	210	245	260	210	230	240	300	300
22	345	320	310	220	220	395	310	230	230	240	230	210	I A 220	220	230	200	210	240	205	240	270	250	320	320
23	320	300	250	250	E S 250	260	260	230	210	200	225	H 200	230	225	230	230	210	200	240	250	260	270	290	290
24	270	300	300	250	250	300	250	210	195	230	225	230	220	220	225	220	210	200	240	220	220	240	300	310
25	310	290	275	230	210	275	270	240	220	230	220	220	250	200	230	220	210	205	220	250	210	350	260	300
26	310	300	260	210	200	200	280	235	230	230	240	200	220	220	205	240	220	200	230	240	250	240	240	310
27	300	300	300	260	240	205	280	230	220	200	260	250	250	200	230	200	280	200	240	250	240	250	240	340
28	350	325	300	250	220	250	250	230	230	220	240	220	230	215	H 205	245	210	210	A	260	220	240	290	300
29	300	310	310	290	220	250	250	225	220	230	230	205	I A 220	230	225	205	225	220	200	240	260	220	290	290
30	290	300	300	270	230	260	240	220	210	H 180	240	220	225	220	200	230	210	200	250	240	220	260	290	280
31	250	270	290	280	240	260	210	210	220	210	220	220	205	250	230	230	220	210	250	240	I A 240	310	280	310
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	27	28	28	28	28	27	28	28	28	30	30	30	30	30	30	30	30	29	29	29	29	29	27
MED	300	300	290	260	240	255	250	222	220	220	220	210	220	220	222	220	210	205	240	240	230	240	280	300
UQ	315	300	300	285	260	295	275	230	230	230	240	220	230	230	230	230	220	220	250	250	240	260	300	310
LQ	280	290	278	240	220	240	240	212	215	208	205	200	205	210	210	215	210	200	220	220	220	230	250	290

DEC. 1973 | H'F (KM)

IONOSPHERIC DATA

DEC. 1973 | H'ES (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 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	100	100	100	100	100	B	100	100	120	110	110	110	110	105	100	G	100	100	100	100	110	B	S	100
2	100	100	B	B	105	100	100	G	G	170	100	100	100	G	G	G	150	120	100	100	S	B	B	S
3	S	100	100	B	B	B	S	110	105	G	100	G	100	100	100	100	G	100	100	110	S	S	S	100
4	100	100	S	100	100	100	S	110	110	105	105	105	105	105	G	G	B	S	S	S	B	S	105	105
5	130	110	110	105	110	B	S	G	130	110	140	110	110	110	100	110	B	110	100	100	100	100	100	100
6	100	100	100	100	100	100	100	100	G	G	G	110	100	100	100	100	100	100	100	100	100	100	100	100
7	S	S	S	100	100	B	100	100	100	G	100	100	110	110	110	105	120	100	100	100	100	100	100	100
8	100	100	100	100	100	100	100	140	140	130	G	G	110	G	105	100	100	105	S	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	100	105	105	100	100	100	140	100	B	100	S	100	100	S
11	100	100	100	100	100	100	100	100	100	100	100	100	100	110	110	110	110	105	100	100	S	100	100	100
12	100	S	S	S	110	110	100	B	G	B	110	B	B	100	100	100	B	B	100	S	S	S	B	S
13	S	S	100	100	B	B	S	B	G	G	170	105	100	100	E G 200	100	G	S	100	100	100	100	100	B
14	B	B	B	B	B	B	100	G	110	160	G	G	G	G	G	155	140	S	B	B	S	S	B	C
15	S	C	C	C	C	C	C	C	C	C	180	100	100	180	100	100	100	100	B	B	S	S	B	S
16	B	B	S	B	105	B	155	130	G	115	110	110	G	155	G	G	170	120	100	110	100	100	100	100
17	100	100	100	S	100	B	S	G	G	G	110	105	G	G	100	100	G	100	B	B	B	S	B	S
18	S	B	B	105	S	S	B	G	G	120	G	G	G	G	100	100	100	100	B	S	S	S	S	S
19	S	S	S	S	B	S	S	G	100	150	140	105	110	105	100	G	G	100	100	B	B	S	S	S
20	S	110	S	S	S	110	100	B	G	150	130	G	120	G	G	G	G	100	100	S	S	S	110	100
21	105	100	120	115	110	110	170	G	G	140	140	110	130	120	170	130	100	100	100	100	S	135	S	S
22	B	B	B	S	S	B	S	G	G	155	G	120	110	110	110	110	110	100	100	100	100	S	S	S
23	B	S	S	B	S	100	105	100	100	100	100	G	G	G	150	125	G	S	S	S	100	100	100	100
24	100	90	S	100	B	S	110	G	G	105	170	155	150	140	125	120	G	B	B	B	B	100	S	105
25	105	B	B	100	B	S	S	G	155	G	G	120	110	G	150	G	G	S	B	S	S	S	B	S
26	S	S	S	B	S	S	S	B	110	G	B	110	120	110	G	G	G	S	S	S	S	B	B	S
27	B	S	S	S	B	S	S	G	G	G	G	150	140	115	155	G	B	S	100	S	S	B	B	B
28	S	S	110	100	100	100	105	B	G	170	130	115	G	G	105	155	120	100	100	100	100	100	100	105
29	S	B	B	100	100	100	100	G	G	160	G	120	115	115	110	G	G	B	100	100	B	B	S	B
30	B	S	S	100	100	100	B	G	G	G	125	130	G	G	G	105	105	B	S	B	100	100	110	S
31	B	B	B	B	B	B	B	G	G	120	110	110	110	G	155	100	120	150	B	105	110	110	S	105
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	12	10	15	15	12	15	9	12	18	21	23	22	19	23	20	16	19	17	15	11	13	12	13
MED	100	100	100	100	100	100	100	100	110	125	110	110	110	110	105	102	110	100	100	100	100	100	100	100
UQ	102	100	110	100	105	105	105	110	125	155	140	118	115	115	U 128	115	130	105	100	100	100	100	102	105
LQ	100	100	100	100	100	100	100	100	100	110	100	105	100	102	100	100	100	100	100	100	100	100	100	100

The Radio Research Laboratories, Japan

DEC. 1973 | H'ES (KM)

IONOSPHERIC DATA

DEC. 1973 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 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	F 2	F 2	F 3	F 2	F 2		F 1	L 2	C 2	C 1	C 1	L 1	L 1	L 1	L 1		L 2	F 2	F 3	F 1	F 2			F 1
2	F 2	F 1			F 2	F 1	F 1			HC 12	L 1	L 1	L 1				HL 22	F 1	F 1	F 2				
3		F 1	F 1					L 1	L 2		L 1	F 2	L 1	L 1	L 2	L 1		F 1	F 2	F 2				
4	F 1	F 1		F 2	F 2	F 1		L 2	L 1	L 1	L 1	L 1	L 1	L 1									F 2	F 3
5	F 1	F 3	F 2	F 2	F 1				H 1	C 2	H 1	C 2	C 2	C 1	C 1	C 1		F 1	F 1	F 2	F 2	F 1	F 2	F 2
6	F 1	F 1	F 2	F 2	F 2	F 1	L 2	L 2				C 1	C 2	L 2	C 2	L 2	L 2	F 3	F 1	F 2	F 2	F 2	F 1	F 1
7				F 1	F 1		F 1	L 1	L 1		L 2	L 1	C 2	C 2	C 2	L 2	C 2	F 2	F 1	F 1	F 2	F 2	F 2	F 2
8	F 3	F 2	F 1	F 1	F 1	F 1	F 1	H 2	H 2	H 1			L 1		L 1	L 1	L 1	F 1						
9																								
10											L 1	C 1	L 1	L 1	L 1	L 1	HL 11	F 1		F 1		F 2	F 1	
11	F 2	F 3	F 2	F 2	F 1	F 1	F 2	L 2	L 3	L 1	L 1	L 1	L 1	CL 11	C 1	C 1	L 3	F 1	F 1	F 1		F 1	F 1	F 1
12	F 1				F 1	F 1	F 3				C 1			L 1	L 1	L 1			F 1					
13			F 1	F 1							H 1	L 1	L 1	L 1	HL 11	L 1			F 2	F 2	F 1	F 1	F 1	
14							F 1		C 1	HL 11						H 1	H 2							
15											H 1	L 1	L 1	HL 11	L 1	L 1	L 2	F 1						
16					F 1		F 2	H 2		L 1	C 1	L 1					H 1	F 1	F 1	F 2	F 2	F 2	F 2	F 1
17	F 1	F 2	F 1		F 1	F 1					C 2	L 1			L 1	L 2								
18				F 1						H 1					L 1	L 2	L 1	F 1						
19									L 1	HL 11	HL 11	H 1	C 1	L 1	L 1			F 1	F 1					
20		F 1				F 1	F 2			H 1	H 1		C 1					F 1	F 1				F 1	F 3
21	F 2	F 1	F 1	F 1	F 2	F 3	F 1			H 1	H 2	L 2	HL 21	H 2	HL 11	HL 21	L 2	F 1	F 1	F 1		F 1		
22										H 1		H 1	C 2	C 2	C 1	L 2	L 1	F 1	F 1	F 2	F 1			
23						F 1	F 1	L 1	L 2	L 1	L 1				H 1	H 2					F 2	F 1	F 1	F 1
24	F 1	F 2		F 1			F 1			L 1	H 1	H 1	H 1	H 1	HL 11	C 1						F 1		F 2
25	F 2			F 1					H 1			H 1	C 1		HL 11									
26									L 1			C 1	H 1	C 1										
27												H 1	H 1	C 1	H 1				F 1					
28			F 2	F 2	F 3	F 1	F 1			H 1	H 1	C 1			L 1	H 1	CL 11	F 2	F 2	F 1	F 1	F 1	F 1	F 1
29				F 2	F 2	F 3	F 1			H 1		C 1	C 1	C 1	C 1				F 1	F 1				
30				F 1	F 3	F 1					H 1	H 1				L 1	L 1				F 1	F 2	F 1	
31										H 2	C 2	L 1	C 1		H 1	L 1	C 1	F 1		F 2	F 5	F 2		F 4
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

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DEC. 1973 | TYPES OF ES

IONOSPHERIC DATA

DEC. 1973 | HPF2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 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	340	A	A	320	310	250	310	U R 240	240	250	280	260	R 300	J R 275	250	230	220	290	310	290	290	F 290	350	350
2	A	350	U F 360	340	320	320	300	250	R 240	280	R	300	250	300	260	260	230	250	280	300	290	270	300	340
3	320	350	F 340	F 340	340	350	300	250	240	245	I R 270	260	J R 280	290	250	260	240	290	280	280	250	270	340	300
4	300	320	310	300	300	300	310	J R 270	260	240	260	280	260	260	290	260	260	260	300	300	R	300	300	I A 300
5	305	I A 300	I A 300	340	300	380	J R 260	250	250	R	300	J R 250	J R 260	260	280	260	255	260	J R 300	290	F	260	360	360
6	320	F	360	300	300	300	300	R	J R 250	280	280	280	260	260	J R 250	280	I R 260	290	270	J R 260	250	250	300	F
7	F	310	300	260	J R 210	340	300	250	I R 250	240	250	240	250	240	250	240	H 240	290	250	280	250	280	295	I A 350
8	350	310	300	310	240	250	270	250	250	245	230	240	R 240	250	250	220	240	220	250	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	290	260	J R 250	240	260	260	260	240	260	250	250	290	F	F	F
11	300	300	310	300	280	210	U R 330	250	U R 250	250	R	J R 260	260	250	250	250	240	240	260	I R 290	250	300	J R 360	350
12	360	320	320	260	260	310	A	230	280	300	250	280	255	J R 260	250	260	260	260	280	300	260	300	300	I R 250
13	300	300	305	300	330	280	250	250	250	U R 250	250	255	250	250	270	260	250	260	260	290	260	300	300	320
14	290	310	310	315	290	250	300	240	220	270	280	250	270	310	250	220	220	260	260	280	275	290	240	C
15	F 340	C	C	C	C	C	C	C	C	C	270	J R 250	300	260	260	240	250	270	280	290	290	270	290	360
16	370	350	330	250	280	270	345	250	220	240	230	240	270	260	R 270	250	240	240	290	240	240	270	310	310
17	320	320	320	290	260	250	300	260	220	220	290	260	250	270	250	250	270	250	260	250	F 290	270	265	260
18	350	310	280	280	300	F 300	260	240	220	I R 255	J R 280	240	J R 260	260	260	260	220	280	290	250	230	J R 260	300	370
19	350	300	I R 330	J R 260	260	350	R 310	260	250	250	250	I R 270	260	250	260	J R 250	260	210	320	290	260	J R 260	290	310
20	360	360	320	290	360	350	290	J R 260	250	260	250	280	290	260	250	250	270	290	280	250	310	J R 310	270	A
21	350	330	320	310	310	300	310	290	R	260	260	290	R 280	I A 260	J R 250	230	230	300	305	240	250	300	S 350	350
22	390	J F 380	F 360	J S 280	240	400	340	240	260	R 260	280	270	R 300	230	250	240	220	300	J R 240	F 290	320	280	350	F 360
23	360	350	300	290	280	300	300	260	R	250	R 240	U R 250	J R 260	R	260	U R 250	240	240	290	290	320	305	330	340
24	310	340	350	290	300	350	300	250	250	R 250	280	260	300	250	250	240	250	280	295	280	280	260	340	350
25	F 360	340	310	260	240	290	290	260	240	R 250	260	260	R 250	300	J R 260	260	260	250	290	300	250	360	300	F
26	J R 360	F	F	R	R	210	300	J R 260	260	280	I R 260	R	290	J R 290	280	260	250	240	260	280	300	280	270	360
27	350	340	350	300	280	250	300	280	250	260	330	280	J R 270	260	260	J R 300	260	260	280	300	260	290	260	390
28	390	360	J R 350	250	250	260	300	260	250	280	260	260	260	260	250	310	220	240	A	300	260	250	300	300
29	320	350	340	340	260	280	290	250	230	250	260	J R 260	260	260	260	290	260	280	240	250	300	250	310	350
30	340	350	340	300	260	310	280	260	220	R 250	270	R 260	J R 270	260	270	260	240	220	295	270	290	310	320	340
31	300	300	320	310	280	310	240	250	240	220	290	J R 250	290	280	240	250	250	250	290	280	I A 275	F 340	340	320
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	25	26	27	27	28	27	27	26	28	28	29	30	29	30	30	30	30	29	29	27	28	28	24
MED	340	330	320	300	280	300	300	250	250	250	260	260	260	260	255	255	245	260	280	280	275	280	300	345
UQ	360	350	340	310	300	330	305	260	250	265	280	270	280	270	260	260	260	280	290	290	290	300	340	355
LQ	315	310	310	280	260	255	290	250	240	248	250	250	255	260	250	240	240	240	260	260	250	265	292	310

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DEC. 1973 | HPF2 (KM)

IONOSPHERIC DATA

DEC. 1973 | YPF2 (KM) | 135 E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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	70	A	A	80	90	100	80	U R 60	60	50	60	60	R 50	J R 50	70	70	50	110	90	80	70	F 100	100	100
2	A	90	U F 90	110	120	80	90	50	R 50	40	R	70	50	70	50	40	70	50	70	90	70	90	100	100
3	120	90	F 110	F 90	110	100	95	50	50	85	I R 100	100	J R 90	90	110	100	100	100	100	100	110	110	120	90
4	90	100	100	90	90	90	90	J R 100	90	100	100	100	100	100	100	100	100	100	90	90	R	90	90	I A 90
5	95	I A 90	I A 95	120	90	100	J R 100	110	110	R	90	J R 90	J R 100	100	100	100	85	100	J R 90	90	F	100	100	100
6	100	F	100	90	90	90	90	R	J R 80	100	100	100	100	70	J R 90	110	I R 100	100	100	J R 100	90	110	90	F
7	F	90	100	100	J R 90	100	90	110	I R 105	50	50	50	40	60	60	50	H 60	70	50	70	60	75	100	I A 95
8	100	90	100	90	50	60	90	50	30	50	40	60	R 50	40	30	80	60	80	60	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	80	100	J R 90	100	100	100	100	90	100	90	110	100	F	F	F
11	90	90	90	90	100	90	U R 90	90	U R 110	80	R	J R 100	100	110	100	80	100	90	100	I R 105	90	100	J R 100	110
12	100	90	110	100	100	100	A	100	100	100	110	100	85	J R 100	90	110	100	100	100	90	100	90	90	I R 100
13	90	90	100	90	90	100	110	110	80	U R 50	50	50	60	50	40	40	60	60	85	70	55	100	100	90
14	80	90	90	85	60	50	100	40	50	60	70	90	90	70	50	60	60	100	80	80	60	70	60	C
15	F 110	C	C	C	C	C	C	C	C	C	60	J R 50	90	50	40	60	50	100	80	110	70	60	110	90
16	80	90	70	60	120	130	100	50	60	55	50	60	40	50	R 40	45	50	60	70	60	60	70	90	90
17	80	80	80	70	70	50	100	50	50	50	70	55	50	50	45	50	60	50	50	50	F 105	50	80	90
18	90	90	65	100	100	F 70	60	60	50	I R 75	J R 100	90	J R 100	100	100	100	110	100	90	110	100	J R 100	90	90
19	110	90	I R 95	J R 100	100	400	R 100	110	100	100	90	I R 95	100	110	100	J R 100	90	100	100	90	100	J R 90	100	100
20	100	100	100	90	100	110	100	J R 100	100	70	50	40	60	50	70	60	70	110	70	60	85	J R 90	90	A
21	90	70	80	90	70	100	90	70	R	40	50	70	R 70	I A 45	J R 60	60	50	95	85	50	60	95	S 100	100
22	100	J F 65	F 90	J S 70	60	100	100	60	60	R 55	50	40	R 70	60	50	60	60	100	J R 60	F 60	90	60	90	F 90
23	90	100	100	70	80	95	60	55	R	50	R 60	U R 60	J R 50	R	50	U R 50	60	60	60	60	130	95	120	100
24	90	110	100	70	90	100	90	50	50	R 50	60	50	85	50	50	40	50	90	100	100	100	55	70	90
25	F 110	100	85	50	50	80	100	50	60	R 90	80	90	R 90	80	J R 80	90	100	110	100	90	100	100	90	F
26	J R 100	F	F	R	R	80	90	J R 100	100	100	I R 100	R	100	J R 100	100	100	100	110	100	100	90	100	100	100
27	100	100	90	90	100	100	100	100	110	100	90	100	J R 90	100	100	J R 80	100	100	100	90	100	90	100	100
28	100	100	J R 100	110	110	100	90	100	90	90	50	80	50	50	50	80	70	60	A	100	70	50	100	100
29	80	100	110	100	90	80	80	65	70	50	50	J R 60	60	50	70	70	80	80	90	60	90	60	85	100
30	110	100	100	90	50	90	70	50	50	R 50	40	R 50	J R 60	70	50	40	60	50	100	50	60	100	130	100
31	100	100	90	90	70	90	50	50	50	60	70	J R 50	50	40	60	50	50	50	70	70	I A 75	F 110	100	90
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	25	26	27	27	28	27	27	26	28	28	29	30	29	30	30	30	30	29	29	27	28	28	24
MED	100	90	98	90	90	98	90	60	65	60	65	70	78	70	65	70	70	100	90	90	90	90	100	100
UQ	100	100	100	100	100	100	100	100	100	90	95	90	100	100	100	100	100	100	100	100	100	100	100	100
LQ	90	90	90	82	70	80	90	50	50	50	50	50	50	50	50	50	60	60	70	60	70	70	90	90

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DEC. 1973 | YPF2 (KM)

IONOSPHERIC DATA

DEC. 1973 FOF2 (0.1 MHZ) 135 E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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	28	28	28	30	31	28	28	48	S 65	S 66	65	83	C 102	U C 98	H 81	78	66	58	38	52	39	I A 28	25	26
2	29	29	30	30	31	33	29	48	58	63	68	70	70	76	C 83	79	69	S 45	I S 57	38	35	25	25	24
3	27	29	30	30	29	29	28	J S 49	J S 77	65	70	74	73	H 70	66	66	60	57	39	38	38	32	27	29
4	27	28	I A 29	29	29	24	27	S 44	U S 62	59	62	65	77	J C 86	69	62	U C 80	U C 62	I S 49	J S 51	J S 50	22	26	21
5	30	28	32	24	26	25	28	S 41	44	70	C	C 93	72	S 72	74	68	72	53	37	S 45	S 52	33	23	28
6	31	31	32	30	F 30	F 27	I A 30	S 48	53	67	62	I C 95	C 94	93	79	H 71	59	58	I S 56	37	35	27	29	25
7	27	29	29	C 32	31	H 20	21	35	57	55	70	67	58	V 67	67	60	S 57	45	36	27	S 39	29	23	24
8	F	F 28	30	28	28	23	20	33	59	69	83	73	72	72	S 77	63	51	45	H 35	H 29	29	27	26	S 28
9	30	29	30	29	28	24	24	39	60	74	66	67	75	58	54	54	63	56	42	36	C 49	C	C 40	C 37
10	33	27	29	29	30	30	31	J S 43	64	67	71	73	85	64	59	68	68	48	29	28	28	25	22	F 27
11	F 27	S 27	27	30	32	24	J C 17	32	56	58	76	66	68	65	70	56	58	S 50	S 43	I A 31	31	30	25	22
12	24	25	29	31	30	23	27	35	47	60	71	75	90	73	60	63	64	47	35	35	39	29	30	26
13	26	28	31	30	C 31	31	34	32	56	59	67	76	71	70	76	62	I C 54	43	38	25	25	26	31	29
14	29	28	27	28	28	23	21	35	51	65	70	75	J S 76	68	S 103	76	66	46	S 37	28	28	26	S 26	24
15	25	26	J S 26	J S 28	33	28	S 25	J S 35	57	H 56	63	64	69	83	78	60	56	58	47	S 39	36	35	29	24
16	24	27	32	35	36	S 27	25	37	72	56	73	57	67	92	H 67	H 57	73	50	S 42	S	S 26	30	S 26	26
17	26	26	27	27	30	H 23	21	33	S 58	63	58	73	83	90	76	68	58	78	J S 52	41	J S 39	30	30	21
18	23	27	S 29	S 28	29	J S 39	H 20	34	53	64	59	60	75	72	65	65	66	50	34	J S 42	31	23	23	S 24
19	25	J S 26	S 32	U S 28	F	U S 26	20	33	55	J S 64	58	63	63	H 69	64	59	66	69	S 50	33	33	37	30	28
20	28	28	30	34	28	29	29	34	52	S 62	I C 72	75	S 100	88	72	H 82	65	H 56	53	37	31	I S 34	35	26
21	28	31	32	32	31	F	27	33	71	72	64	70	H 74	H 84	76	75	H 67	55	S 43	56	34	30	F 30	29
22	S 27	30	31	S 42	30	S 21	22	S 40	58	S 82	J S 102	82	H 87	86	80	60	65	61	J S 63	52	S 37	S 39	28	29
23	29	30	32	30	34	25	23	35	S 62	72	71	F 64	V 80	83	69	H 68	78	S 73	H 44	32	33	40	36	39
24	34	33	32	33	35	S 27	28	S 34	58	66	76	73	84	V 72	71	72	61	55	44	32	27	27	S 28	F 25
25	F	27	28	28	30	19	17	30	50	70	73	74	74	87	88	93	J C 105	U C 115	J S 66	S 45	40	32	26	26
26	25	26	27	33	32	22	16	28	54	65	59	67	59	J C 85	S 65	H 72	S 74	S 72	H 52	H 34	32	35	H 25	24
27	24	25	28	29	35	33	22	28	50	70	I S 80	H 83	H 93	S 92	S 75	H 57	62	58	44	29	32	35	26	22
28	22	25	26	28	32	23	J S 17	31	52	56	69	63	64	81	85	J S 97	70	65	I S 46	36	36	J S 42	25	22
29	26	27	27	29	35	28	24	35	48	56	63	V 70	70	82	J S 87	72	61	J S 66	62	37	31	31	28	25
30	25	27	27	28	S 34	25	24	34	52	56	55	66	70	73	72	J S 73	80	S 75	S 38	U S 35	J S 51	U S 51	S 36	31
31	F 26	22	24	25	31	22	25	29	50	49	65	68	85	J S 84	90	63	56	56	43	44	28	22	22	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	29	31	31	31	30	30	31	31	31	31	30	31	31	31	31	31	31	31	31	30	31	30	31	31
MED	27	28	29	29	31	25	24	35	56	64	68	70	74	81	74	68	65	56	43	36	34	30	26	26
UQ	29	29	31	30	32	28	28	40	60	68	72	75	84	86	80	72	70	64	S 51	42	39	35	30	28
LQ	25	26	27	28	29	23	21	33	52	58	63	66	70	71	67	61	60	50	38	32	31	27	25	24

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DEC. 1973 FOF2 (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 FOF1 (0.01 MHZ) 135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L	L	L	L							
2										L 330	L	L	L	L 380	L	L	L							
3									L	L	L	L 420	L	L 440	L	320								
4									L	L	L 380	U L 420	U L 440	L 420	L	300								
5										L	L	L	A	A	A	A	L							
6									H 270	H 310	L	L	L	L	L	L	L 270							
7											L	L	L	L	L	L	L							
8										L	L	L	L 410	L	L	L	L							
9										L	L	L	H 400	L	L	320								
10										L	L 370	L	L	U L 400	L	L	L							
11										L	L	L	L 420	L	L	L								
12										L	L	L	H 400	L 410	L 380	L								
13									250	L	H 360	L	L	L	L	L	C							
14										L	410	L	L 430	450	L	L	L	L						
15										L	L	L	L	L	L	L	L							
16										290	L	L	L	L	L	L	260							
17										L	L	420	L 440	L 430	U L 410	L	L							
18										L	L	L	L	H 520	L	L	L							
19										L	L	L	L	L	L	L								
20											C	L	L	L	L	L								
21											L	L	L	L	L	L	L							
22										L	L	L	L	L	L	L	A							
23									L	L	L	L	L	L	L	L	H 290							
24										L	L	L	L	L 430	L	L	L 260							
25										L	L	L	L	L	L 410	L	L							
26										L	L	L	L	L	L	L	L							
27									L	L	L	L	L	L	A	L								
28										L	L	L	L	L	420	L	L							
29										290	L	L	L	L	L	L	L							
30										L	L	L 410	L 410	L 420	L	L	L							
31										L	L	L		L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									2	4	4	4	8	10	4	3	4							
MED									260	300	375	L 420	L 415	L 425	L 410	320	265							
UQ										320	395	L 420	L 435	L 440	415	320	280							
LQ										290	365	415	405	L 410	L 395	310	260							

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DEC. 1973 FOF1 (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 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								S	200	I A 260	300	305	310	I R 305	290	265	I A 215	S						
2								S	220	270	300	310	320	320	295	270	230	S						
3								S	220	265	285	300	I A 310	315	I A 290	260	200	S						
4								S	210	270	290	305	310	305	295	I A 260	205	S						
5								S	H 200	260	280	300	300	290	280	250	A	S						
6								S	A	240	270	280	285	I A 280	270	240	210	S						
7								S	180	240	270	285	A	A	A	250	I A 215	S						
8								S	170	250	275	290	295	290	A	A	A	S						
9								S	195	250	280	295	A	A	A	A	H 220	S						
10								S	185	250	275	290	I A 300	295	275	250	190	S						
11								S	200	260	280	295	305	295	I A 280	A	A	S						
12								S	185	H 250	A	A	290	I A 300	290	H 270	230	S						
13								S	210	260	290	R	310	300	290	260	C	S						
14								S	220	H 255	I A 275	I A 290	310	305	285	I A 255	200	S						
15								S	195	250	270	300	305	300	290	260	220	S						
16								S	170	260	I A 280	300	I A 310	I A 305	290	270	220	S						
17								S	H 200	265	290	A	A	A	290	270	205	S						
18								S	200	260	290	295	305	305	290	275	250	S						
19								S	200	250	300	310	A	A	290	270	220	S						
20								S	180	250	I C 280	300	I A 305	300	H 295	270	230	S						
21								S	180	I A 250	280	I A 295	305	I A 310	280	270	230	S						
22								S	190	255	290	310	310	A	A	A	A	S						
23								S	200	260	280	I A 295	310	305	295	270	I A 230	S						
24								S	190	260	280	300	305	305	290	265	245	S						
25								S	180	260	285	305	A	A	300	I A 280	240	S						
26								S	180	250	H 295	H 305	310	305	A	A	A	S						
27								S	H 180	H 250	H 285	295	310	305	290	270	230	S						
28								S	H 170	250	275	295	310	I A 300	A	A	230	S						
29								S	190	255	A	A	305	305	290	270	230	S						
30								S	A	240	275	290	295	300	290	270	235	S						
31								S	170	H 240	275	280	290	290	290	250	230	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	31	29	27	26	25	25	25	25							
MED									190	255	280	295	305	305	290	270	230							
UQ									200	260	290	302	310	305	290	270	230							
LQ									180	250	275	292	300	300	290	260	215							

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DEC. 1973 | FOE (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E C 15	E C 16	E C 15	E C 16	E C 16	E S 13	E S 14	J X 17	26	28	G 29	G 29	G	G 30	G 26	G	J X 27	25	J X 30	23	20	J X 28	E S 15	E S 15
2	E C 16	E S 15	J X 20	J X 32	E C 14	J X 22	E S 14	20	J G 21	G	G 26	33	G 30	G 31	G 27	G 20	28	16	J X 26	J X 23	E S 15	E S 15	E S 15	E S 15
3	E S 14	E S 15	E C 15	E C 13	E C 15	E S 15	E S 15	E S 15	G 20	G 23	J X 36	G 22	J X 36	J G 31	J X 34	G 19	G 18	J X 26	25	J X 22	E C 16	E C 14	E C 15	24
4	20	E S 14	J X 45	20	E C 15	E S 14	J X 24	J X 21	24	J X 28	G 29	31	J G 31	J X 32	G	J X 32	J X 34	J X 32	J X 32	J X 21	J X 26	E S 15	E S 14	E C 18
5	E S 13	E S 14	J X 21	23	20	E S 13	E S 14	E S 14	21	28	30	37	47	J X 66	J X 50	J X 40	J X 45	20	J X 24	20	20	20	22	J X 18
6	20	22	19	25	J X 29	20	J X 32	22	21	J G 22	J X 31	G 23	J X 39	31	G 25	G 17	G 19	22	J X 34	J X 20	18	E S 15	22	20
7	E S 15	E S 15	E S 14	E C 17	E C 15	E S 14	E S 15	16	26	31	30	31	J X 33	J X 35	J X 35	28	J X 27	J X 27	J X 20	E S 15	20	E S 15	E S 15	E C 16
8	E C 15	E S 15	E C 15	24	19	E B 15	E S 15	E S 15	24	28	30	32	34	32	29	26	24	20	J X 24	J X 20	J X 27	E S 15	17	17
9	E S 15	E S 15	E C 15	E C 14	E C 15	E S 15	E S 15	E S 14	25	29	32	31	J X 34	34	31	29	G	J X 20	24	E S 14	E C 15	E C 15	E C 18	E C 15
10	E S 14	E C 15	E S 14	E C 14	E C 15	21	E C 15	E S 13	24	G	29	J X 32	J X 38	J X 30	J X 29	G 24	J X 23	E S 13	20	E S 14	17	E S 13	E S 14	E S 14
11	22	E B 14	23	E B 13	E B 14	E B 15	E C 20	E S 13	G	G	G	J X 31	J X 31	J G 29	J X 40	27	24	J X 23	J X 18	J X 32	J X 26	J X 26	J X 19	23
12	E S 15	20	E S 14	E B 16	E B 15	E B 14	E S 14	E S 14	G	G	28	31	G 26	31	G 23	G 25	J G 23	J X 31	J X 19	E S 15	E S 15	E S 15	E S 15	E S 15
13	E S 15	E C 18	E C 14	E C 15	24	24	E S 16	20	G	G	G	G 30	32	J X 31	J X 31	J X 28	C	J X 26	J X 28	J X 26	E S 14	E S 15	E S 14	E S 15
14	E S 15	E S 15	E S 15	E S 14	E B 14	E S 14	E S 14	E S 14	G	28	J X 31	J X 31	J G 30	J G 26	G	J X 27	G	E S 15	J X 18	J X 19	E S 15	E S 15	E S 15	E S 15
15	E S 14	E S 15	E S 14	E S 14	E S 15	E S 15	E S 15	E S 13	J X 20	G	33	33	G 24	J G 27	J X 31	G 19	G 18	E S 15	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15
16	E S 15	E S 15	E S 15	E B 15	E B 15	E S 14	E S 15	E S 14	G	28	J X 31	J X 32	36	44	G 26	G 27	J X 31	E S 15	E S 15	J X 24	23	18	E S 15	E S 15
17	19	23	20	E S 14	E B 11	E S 15	E S 15	E S 15	G	G	J X 33	J X 39	J X 34	J X 45	G 25	G	G	25	22	20	E S 14	E S 14	E S 14	E S 14
18	E S 14	E S 14	E S 14	E S 15	E S 14	E S 14	E S 14	E S 14	G	G 23	J X 30	32	33	32	G	30	G 18	E S 14	E S 14	E S 14	21	E S 14	E S 14	E S 14
19	E S 15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14	G	27	33	39	35	40	31	G 19	G	E S 14	E S 15	E S 15	E S 15	E S 15	E S 14	E S 15
20	E S 15	E S 15	E S 14	19	E B 15	19	E S 15	E S 14	21	G	C	36	39	40	38	32	29	J X 26	27	24	E S 14	E S 14	E S 14	E S 14
21	E S 14	E S 14	E B 12	E B 13	E	E S 14	E S 14	E S 15	G	30	30	31	33	J X 53	33	30	26	17	19	E S 14	E S 15	E S 15	E S 14	J X 34
22	J X 31	24	J X 23	22	E S 14	E S 14	E S 15	E S 14	G	G	G	35	37	35	J X 58	J X 70	J X 50	J X 30	J X 30	J X 26	E S 14	19	E S 15	E S 14
23	E S 14	E S 14	E S 14	E S 14	E S 14	25	E S 14	E S 14	G	G 14	G	33	36	38	33	J X 46	27	35	27	J X 21	E S 15	E S 14	E S 15	E S 15
24	E S 15	E S 14	24	24	19	E S 14	E S 14	E S 14	G	G 22	32	33	37	37	33	J X 29	G	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15
25	J X 30	25	E S 14	E S 14	E S 14	J X 22	E S 15	E S 14	G	G	J X 31	32	J X 45	J X 58	J X 32	J X 85	35	J X 27	E S 13	15	J X 22	E S 14	24	E S 14
26	E S 14	E S 14	20	23	21	E S 15	E S 15	E S 14	G	G	32	33	35	34	33	J X 36	J X 46	J X 31	20	20	19	E S 14	E S 14	E S 14
27	J X 26	24	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	18	G	G	G	36	35	33	43	J X 29	24	22	16	E S 14	E S 14	J X 21	E S 15	E S 14
28	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	24	22	G	G	31	31	36	32	62	40	J X 27	J X 23	J X 26	J X 31	J X 26	J X 18	E S 14	24
29	E S 15	E S 14	E S 14	E S 14	E S 14	17	22	18	G	27	32	32	J G 29	J G 27	G 22	J X 31	G 17	E S 14	24	22	E S 14	E S 15	E S 14	E S 14
30	E S 14	E S 14	E S 15	18	16	E S 14	E S 14	E S 15	J X 26	J X 30	31	38	35	J X 32	J X 37	G	G	E S 15	E S 15	E S 14	E S 15	E S 14	E S 15	E S 14
31	23	E S 13	J X 21	E S 14	E	E S 14	E S 15	E S 14	G	G	30	33	G	G 26	30	J X 37	35	J X 33	16	E S 14	E S 14	J X 24	J X 21	E S 14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	E S 15	E S 15	E 15	E E 15	E E 15	E S 14	E S 15	E S 14	G	G 22	30	32	34	32	31	28	24	22	20	20	E S 15	E S 15	E S 15	E S 15
UQ	18	E E 16	20	20	E 16	16	E S 15	16	21	28	32	33	36	38	34	J X 32	J X 29	J X 26	J X 26	J X 22	20	16	E E 15	E E 16
LQ	E S 14	E S 14	E S 14	E S 14	E E 14	E S 14	E S 14	E S 14	G	G	G 29	31	31	31	G 26	G 22	G 18	E S 15	16	E S 14	E S 14	E S 14	E S 14	E S 14

DEC. 1973 | FOES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FBES (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 C 15	E C 16	E C 15	E C 16	E C 16	E S 13	E S 14	G	25	E R 28	G 29	G 29	G	E R 30	G 26	G	24	G	18	E	17	A	E S 15	E S 15
2	E C 16	E S 15	E	19	E C 14	E	E S 14	G	G 16	G	G 25	G	G 30	G 30	G 27	G 20	G	14	19	19	E S 15	E S 15	E S 15	E S 15
3	E S 14	E S 15	E C 15	E C 13	E C 15	E S 15	E S 15	E S 15	G 20	G 22	25	G 22	34	G 28	33	G 19	G 17	17	16	20	E C 16	E C 14	E C 15	E
4	E	E S 14	A	E	E C 15	E S 14	16	19	G	26	G 25	29	G 28	29	G	29	20	32	20	18	17	E S 15	E S 14	E C 18
5	E S 13	E S 14	17	E	E	E S 13	E S 14	E S 14	21	G	G	35	47	64	46	37	28	16	17	E	E	E	E	16
6	E	E	E	E	22	17	A	G	19	G 18	21	G 23	25	31	G 25	G 17	G 17	G	25	17	E	E S 15	E	E
7	E S 15	E S 15	E S 14	E C 17	E C 15	E S 14	E S 15	15	24	30	G	30	30	34	32	G	23	18	E	E S 15	E	E S 15	E S 15	E C 16
8	E C 15	E S 15	E C 15	E	E	E B 15	E S 15	E S 15	23	G	29	G	33	31	E R 29	26	22	19	E	E	22	E S 15	E	E
9	E S 15	E S 15	E C 15	E C 14	E C 15	E S 15	E S 15	E S 14	23	28	29	30	31	32	30	28	G	15	E	E S 14	E C 15	E C 15	E C 18	E C 15
10	E S 14	E C 15	E S 14	E C 14	E C 15	17	E C 15	E S 13	22	G	27	28	33	28	24	G 23	17	E S 13	E	E S 14	E	E S 13	E S 14	E S 14
11	E	E B 14	E	E B 13	E B 14	E B 15	E C 20	E S 13	G	G	G	23	26	G 27	33	27	23	22	E	A	20	21	E	E
12	E S 15	16	E S 14	E B 16	E B 15	E B 14	E S 14	E S 14	G	G	28	30	G 26	31	G 23	G 25	G 20	23	E	E S 15	E S 15	E S 15	E S 15	E S 15
13	E S 15	E C 18	E C 14	E C 15	E	E	E S 16	G	G	G	G	E R 30	28	28	24	22	C	16	18	20	E S 14	E S 15	E S 14	E S 15
14	E S 15	E S 15	E S 15	E S 14	E B 14	E S 14	E S 14	E S 14	G	28	28	30	G 25	G 26	G	25	G	E S 15	E	E	E S 15	E S 15	E S 15	E S 15
15	E S 14	E S 15	E S 14	E S 14	E S 15	E S 15	E S 15	E S 13	17	G	32	G	G 24	G 25	23	G 17	G 16	E S 15	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15
16	E S 15	E S 15	E S 15	E B 15	E B 15	E S 14	E S 15	E S 14	G	G	29	28	35	34	G 26	G 25	19	E S 15	E S 15	20	E	E	E S 15	E S 15
17	E	E	E	E S 14	E B 11	E S 15	E S 15	E S 15	G	G	G	35	32	33	G 24	G	G	G	E	E	E S 14	E S 14	E S 14	E S 14
18	E S 14	E S 14	E S 14	E S 15	E S 14	E S 14	E S 14	E S 14	G	G 23	26	G	29	32	G	29	G 18	E S 14	E S 14	E S 14	E	E S 14	E S 14	E S 14
19	E S 15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14	G	G	G	G	32	34	G	G 19	G	E S 14	E S 15	E S 15	E S 15	E S 15	E S 14	E S 15
20	E S 15	E S 15	E S 14	E	E B 15	E	E S 15	E S 14	16	G	C	35	33	G	25	20	28	17	E	E	E S 14	E S 14	E S 14	E S 14
21	E S 14	E S 14	E B 12	E B 13	E	E S 14	E S 14	E S 15	G	28	G	31	G	40	31	G	G	E R 17	E	E S 14	E S 15	E S 15	E S 14	20
22	E	E	E	E	E S 14	E S 14	E S 15	E S 14	G	G	G	G	33	35	41	36	29	16	19	E	E S 14	E	E S 15	E S 14
23	E S 14	E S 14	E S 14	E S 14	E S 14	E	E S 14	E S 14	G	G 14	G	30	35	37	33	26	24	G	E	E	E S 15	E S 14	E S 15	E S 15
24	E S 15	E S 14	E	E	E	E S 14	E S 14	E S 14	G	G 21	G	G	35	34	33	22	G	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15
25	15	E	E S 14	E S 14	E S 14	E	E S 15	E S 14	G	G	27	G	39	31	27	32	23	16	E S 13	15	20	E S 14	E	E S 14
26	E S 14	E S 14	E	E	E	E S 15	E S 15	E S 14	G	G	G	G	G	G	32	32	25	25	18	18	E	E S 14	E S 14	E S 14
27	E	E	E S 14	E S 14	E S 14	E S 14	E S 15	G	G	G	G	35	33	33	41	25	16	19	15	E S 14	E S 14	16	E S 15	E S 14
28	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E	G	G	G	31	G	32	31	32	31	21	19	20	28	16	16	E S 14	E
29	E S 15	E S 14	E S 14	E S 14	E S 14	15	E	G	G	25	31	32	G 26	G 24	G 21	20	G 16	E S 14	E	E	E S 14	E S 15	E S 14	E S 14
30	E S 14	E S 14	E S 15	E	E	E S 14	E S 14	E S 15	17	G	G	31	32	28	27	G	G	E S 15	E S 15	E S 14	E S 15	E S 14	E S 15	E S 14
31	E	E S 13	15	E S 14	E	E S 14	E S 15	E S 14	G	G	G	30	G	G 25	28	29	32	33	E	E S 14	E S 14	E	E	E S 14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	E S 14	E S 14	E E 14	E E 14	E E 14	E S 14	E S 15	E S 14	G	G	G 23	28	31	31	27	25	18	16	E E 14	E E 14	E S 15	E S 15	E S 14	E S 14
UQ	E S 15	E S 15	E 15	E S 14	E E 15	E S 15	E S 15	E S 14	18	G 22	28	30	33	34	32	28	23	18	18	18	E E 15	E S 15	E S 15	E S 15
LQ	E S 14	E S 14	E E 13	E	E E 11	E S 14	E S 14	E S 13	G	G	G	G	G 26	G 28	G 24	G 19	G	E S 14	E	E	E S 14	E S 14	E S 14	E S 14

The Radio Research Laboratories, Japan

DEC. 1973 | FBES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | F-MIN (0.1 MHZ) | 135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 C 15	E C 16	E C 15	E C 16	E C 16	E S 13	E S 14	E S 14	15	16	15	16	18	16	15	16	15	E S 14	E S 14	E S 15	E S 14	E S 15	E S 15	E S 15
2	E C 16	E S 15	E C 15	E C 14	E C 14	E S 15	E S 14	E S 15	15	14	15	16	17	15	17	15	15	E S 13	E S 14	E S 14	E S 15	E S 15	E S 15	E S 15
3	E S 14	E S 15	E C 15	E C 13	E C 15	E S 15	E S 15	E S 15	14	13	13	15	14	15	14	14	14	E S 14	E S 14	E S 13	E C 16	E C 14	E C 15	E S 14
4	E S 14	E S 14	E S 14	E S 14	E C 15	E S 14	E S 13	E S 13	13	14	14	15	15	14	14	15	14	E S 13	E S 14	E S 14	E S 14	E S 15	E S 14	E C 18
5	E S 13	E S 14	E S 14	E S 14	14	E S 13	E S 14	E S 14	13	14	14	15	15	15	14	15	14	E S 13	E S 13	E S 15	E S 15	E S 15	E S 14	E S 15
6	E S 15	E S 15	E S 15	E C 15	15	E S 15	E S 15	E S 15	13	14	14	15	15	15	14	14	14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
7	E S 15	E S 15	E S 14	E C 17	E C 15	E S 14	E S 15	E S 14	13	15	13	15	14	15	14	14	13	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15	E C 16
8	E C 15	E S 15	E C 15	E C 15	14	15	E S 15	E S 15	15	15	15	15	13	15	14	15	14	E S 14	E S 14	E S 15	E S 15	E S 15	E S 15	E S 15
9	E S 15	E S 15	E C 15	E C 14	E C 15	E S 15	E S 15	E S 14	14	14	15	14	17	18	16	15	14	E S 14	E S 14	E S 14	E C 15	E C 15	E C 18	E C 15
10	E S 14	E C 15	E S 14	E C 14	E C 15	E C 14	E C 15	E S 13	14	14	14	15	16	15	15	15	13	E S 13	E S 14	E S 14	E S 14	E S 13	E S 14	E S 14
11	E S 15	14	14	13	14	15	E C 20	E S 13	13	14	14	14	15	17	14	14	15	E S 14	E S 14	E S 15	E S 15	E S 13	E S 15	E S 15
12	E S 15	E S 14	E S 14	16	15	14	E S 14	E S 14	14	15	15	15	15	16	15	15	15	E S 14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
13	E S 15	E C 18	E C 14	E C 15	E C 15	E S 14	E S 16	E S 15	14	14	14	15	16	16	14	13	C	E S 15	E S 15	E S 15	E S 14	E S 15	E S 14	E S 15
14	E S 15	E S 15	E S 15	E S 14	14	E S 14	E S 14	E S 14	14	14	15	16	17	15	15	14	13	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
15	E S 14	E S 15	E S 14	E S 14	E S 15	E S 15	E S 15	E S 13	14	13	12	15	14	15	15	14	15	E S 15	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15
16	E S 15	E S 15	E S 15	15	15	E S 14	E S 15	E S 14	14	15	15	17	17	16	15	14	15	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15	E S 15
17	E S 15	E S 15	E S 15	E S 14	11	E S 15	E S 15	E S 15	14	14	14	15	14	14	14	12	14	E S 15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
18	E S 14	E S 14	E S 14	E S 15	E S 14	E S 14	E S 14	E S 14	15	14	14	14	15	14	14	14	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
19	E S 15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14	14	14	14	14	15	14	14	13	14	E S 14	E S 15	E S 15	E S 15	E S 15	E S 14	E S 15
20	E S 15	E S 15	E S 14	E S 14	15	E S 15	E S 15	E S 14	14	14	C	14	15	14	15	12	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
21	E S 14	E S 14	12	13	E	E S 14	E S 14	E S 15	13	14	14	16	15	12	15	13	14	E S 15	E S 13	E S 14	E S 15	E S 15	E S 14	E S 13
22	E S 15	E S 15	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14	13	14	14	15	15	15	16	14	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14
23	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	13	11	14	12	15	14	15	14	14	E S 14	E S 15	E S 14	E S 15	E S 14	E S 15	E S 15
24	E S 15	E S 14	E S 14	E S 14	11	E S 14	E S 14	E S 14	13	14	14	14	14	14	14	13	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15
25	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 15	E S 14	14	14	13	14	15	15	14	15	14	E S 13	E S 13	E S 13	E S 14	E S 14	E S 13	E S 14
26	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 15	E S 14	14	14	15	14	15	15	15	15	14	E S 15	E S 15	E S 13	E S 15	E S 14	E S 14	E S 14
27	E S 15	E S 15	E S 14	E S 14	E S 14	E S 14	E S 15	E S 15	13	14	15	15	15	15	14	14	13	E S 14	E S 13	E S 14	E S 14	E S 13	E S 15	E S 14
28	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14	13	17	20	16	15	14	16	14	13	E S 14	E S 14	E S 15	E S 15	E S 15	E S 14	E S 15
29	E S 15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 13	14	15	14	15	16	14	15	14	15	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14	E S 14
30	E S 14	E S 14	E S 15	E S 14	E S 14	E S 14	E S 14	E S 15	14	14	13	12	15	14	14	15	14	E S 15	E S 15	E S 14	E S 15	E S 14	E S 15	E S 14
31	E S 14	E S 13	13	E S 14	E	E S 14	E S 15	E S 14	14	12	12	14	15	15	14	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 15	E S 14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	E S 15	E S 15	E S 14	E S 14	E E 14	E S 14	E S 15	E S 14	14	14	14	15	15	15	14	14	14	E S 14	E S 14	E S 14	E S 15	E S 15	E S 15	E S 15
UQ	E S 15	E S 15	E S 15	E S 14	14	E S 15	E S 15	E S 15	14	14	15	15	16	15	15	15	14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
LQ	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	13	14	14	14	15	14	14	14	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14

The Radio Research Laboratories, Japan

DEC. 1973 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F2 (0.01) | 135 E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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	310	310	315	300	325	315	320	355	S 370	S 355	345	325	C 345	U C 345	H 345	345	365	345	345	325	360	I A 330	285	275
2	285	290	300	300	320	330	295	335	380	355	365	370	345	330	C 335	345	385	S 375	I S 345	330	335	335	325	290
3	295	295	300	285	285	285	295	J S 345	J S 375	365	365	370	355	H 335	370	355	355	380	335	325	320	320	335	310
4	335	305	I A 320	325	310	320	320	S 365	U S 375	375	355	340	340	J C 350	355	335	U C 360	U C 350	I S 335	J S 305	J S 355	325	330	295
5	305	345	350	330	275	280	315	S 365	365	305	C	C 365	345	S 345	340	365	380	360	300	S 335	S 365	365	305	285
6	290	295	300	305	F 305	F 335	I A 330	S 395	360	345	355	I C 330	C 330	350	345	H 345	355	345	I S 350	325	340	335	345	320
7	310	290	315	C 305	365	H 350	310	345	360	365	355	355	380	V 355	375	385	S 370	365	335	295	S 335	325	325	290
8	F	F 305	315	320	335	385	275	335	340	360	360	385	360	335	S 350	365	365	335	H 315	H 305	345	310	325	S 305
9	315	310	335	345	335	310	310	330	350	365	365	370	360	365	370	335	360	375	355	325	C 330	C	C 320	C 325
10	335	300	315	310	300	310	325	J S 350	375	375	345	375	355	360	335	355	355	385	375	315	355	335	305	F 285
11	F 275	S 300	325	340	325	370	C	335	375	345	365	370	365	345	365	360	375	S 365	S 375	I A 340	315	335	335	320
12	305	310	325	335	345	285	305	345	365	365	380	360	355	385	365	335	365	365	325	315	345	345	335	310
13	295	290	305	335	C 320	340	365	345	375	370	330	365	365	355	370	370	I C 365	360	340	320	295	295	320	310
14	340	290	300	325	340	340	315	340	365	370	340	345	J S 355	315	S 360	355	380	375	S 350	345	315	330	S 325	320
15	280	290	J S 305	J S 320	340	350	S 320	J S 345	385	H 330	355	375	325	350	375	340	355	365	350	S 315	320	345	345	295
16	290	275	295	330	335	S 350	290	350	390	365	385	360	325	350	H 330	H 345	385	380	S 335	S	S 385	335	S 315	310
17	305	305	295	305	345	H 290	325	335	S 380	375	375	335	355	365	345	370	335	350	J S 345	335	J S 350	320	345	330
18	285	300	S 325	S 325	325	J S 370	H 380	350	370	380	350	340	325	315	370	345	375	365	325	J S 345	370	330	365	S 295
19	295	J S 295	S 315	U S 335	F	U S 375	285	355	360	J S 375	370	380	335	H 290	360	305	345	355	S 360	350	305	325	335	315
20	285	285	305	335	285	275	325	355	365	S 340	I C 325	335	S 340	365	340	H 345	355	H 355	360	350	295	I S 290	335	290
21	270	260	310	310	285	F	330	305	340	375	360	370	H 310	H 315	355	360	H 345	355	S 305	355	330	300	F 285	285
22	S 275	275	295	S 335	365	S 245	270	S 325	330	S 375	J S 365	355	H 320	355	360	365	385	355	J S 335	345	S 290	S 310	285	275
23	275	295	320	305	330	330	310	315	S 355	360	375	F 345	V 350	360	350	H 365	345	S 385	H 330	325	285	310	315	305
24	310	305	295	310	345	S 330	295	S 325	355	350	355	345	355	V 335	355	360	355	365	345	320	315	320	S 320	F 305
25	F	295	300	335	395	365	285	325	375	365	350	365	330	315	340	335	J C 355	U C 345	J S 350	S 325	350	320	325	325
26	310	295	310	360	385	355	335	320	345	355	355	360	340	J C 345	S 350	H 330	S 365	S 360	H 330	H 325	315	320	H 320	305
27	290	300	305	325	345	380	320	310	350	340	I S 350	H 325	H 335	S 325	S 335	H 320	370	360	360	305	295	345	340	280
28	270	270	290	320	345	390	J S 365	320	370	325	350	365	310	345	335	J S 325	370	365	I S 340	305	320	J S 355	360	325
29	290	280	290	300	335	360	320	355	375	360	335	V 330	355	330	J S 330	360	330	J S 325	370	360	315	325	325	305
30	280	290	290	305	S 330	350	335	325	380	365	340	345	355	340	340	J S 335	345	S 385	S 330	U S 280	S	U S 295	S 335	340
31	F 295	295	305	295	340	305	330	325	365	380	350	325	350	J S 345	370	355	350	350	315	360	385	325	335	285
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	31	31	30	30	30	31	31	31	30	31	31	31	31	31	31	31	31	30	30	30	31	31
MED	295	295	305	320	335	338	320	340	365	365	355	360	345	345	350	345	360	360	340	325	330	325	325	305
UQ	310	302	315	335	345	360	330	350	375	372	365	370	355	355	365	360	370	370	350	345	350	335	335	318
LQ	285	290	300	305	320	310	295	325	358	352	350	340	332	332	340	335	355	352	330	315	315	320	320	290

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DEC. 1973 | M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F1 (0.01)

135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L	L	L	L							
2										L 410	L	L	L	L 420	L	L	L							
3									L	L	L	L 395	L	375	L	450								
4									L	L	L 415	U L 370	U L 360	L 370	L	420								
5										L	L	L	A	A	A	A	L							
6									H 445	H 425	L	L	L	L	L	L	L 405							
7											L	L	L	L	L	L	L							
8										L	L	L	L 415	L	L	L	L							
9										L	L	L	H 395	L	L	415								
10										L	L 410	L	L	U L 390	L	L	L							
11										L	L	L	L 375	L	L	L								
12										L	L	L	H 400	L 405	L 395	L								
13									420	L	H 415	L	L	L	L	L	C							
14										L	365	L	L 395	360	L	L	L	L						
15										L	L	L	L	L	L	L	L							
16										450	L	L	L	L	L	L	420							
17										L	L	390	L 390	L 365	U L 380	L	L							
18										L	L	L	L	H 365	L	L	L							
19										L	L	L	L	L	L	L								
20											C	L	L	L	L	L								
21											L	L	L	L	L	L	L							
22										L	L	L	L	L	L	L	A							
23									L	L	L	L	L	L	L	L	H 430							
24										L	L	L	L	L 395	L	L	L 430							
25										L	L	L	L	L	L 395	L	L							
26										L	L	L	L	L	L	L	L							
27									L	L	L	L	L	L	A	L								
28										L	L	L	L	L	365	L	L							
29										450	L	L	L	L	L	L	L							
30										L	L	L 385	L 380	L 380	L	L	L							
31										L	L	L		L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									2	4	4	4	8	10	4	3	4							
MED									432	438	412	L 388	L 392	L 378	L 388	420	425							
UQ										450	415	392	398	L 395	L 395	435	430							
LQ										418	388	L 378	L 378	365	372	418	412							

The Radio Research Laboratories, Japan

DEC. 1973 | M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1973 | H'F2 (KM) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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										225	275	260	255	240	230	240	225							
2										230	230	230	255	255	245	240	225							
3									210	235	240	235	265	250	235	240								
4									220	220	240	255	265	240	235	230								
5										290	240	230	250	E A 275	250	230	240							
6									220	245	230	245	240	240	240	235	225							
7											235	240	225	260	240	225	210							
8										240	230	220	240	245	230	230	210							
9										240	230	235	245	240	235	240								
10										230	240	230	245	240	240	240	240							
11										230	240	225	240	255	240	240								
12										240	230	230	255	220	230	240								
13									225	235	255	235	235	240	250	230	C							
14										225	280	250	230	300	240	225	210	200						
15										230	250	220	280	240	230	245	225							
16										215	230	235	260	250	240	245	225							
17										225	245	285	235	240	250	225	225							
18										235	250	250	275	325	235	250	220							
19										220	230	230	250	250	245	240								
20											I C 260	260	260	230	250	250								
21											235	235	270	H 250	265	230	230							
22										260	240	240	275	235	235	230	210							
23									240	225	240	240	255	230	240	230	230							
24										240	255	245	245	245	250	245	220							
25										245	255	245	280	270	255	235	230							
26										235	240	245	255	H 225	245	H 250	225							
27									225	270	235	275	255	235	250	235								
28										255	250	240	250	250	255	255	210							
29										230	250	260	245	270	250	250	235							
30										240	240	255	240	260	240	225	240							
31										220	255	290		240	245	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									6	28	31	31	30	31	31	31	21	1						
MED									222	235	240	240	252	242	240	240	225	200						
UQ									225	240	250	252	260	254	250	242	230							
LQ									220	225	235	232	240	240	235	230	220							

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DEC. 1973 | H'F2 (KM)

IONOSPHERIC DATA

DEC. 1973 | H'F (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	250	260	290	290	250	250	275	230	220	200	185	H 200	H 205	H 200	210	H 200	225	215	200	245	200	A	E S 270	E S 310
2	300	320	315	305	275	240	E S 240	235	H 205	200	H 195	H 195	H 200	H 175	240	230	230	H 190	215	240	210	230	240	E S 300
3	290	300	300	305	300	295	280	230	220	H 200	H 200	H 185	H 205	210	220	195	230	205	210	245	230	235	245	275
4	250	290	I A 280	235	250	265	280	220	220	210	H 200	190	H 190	H 200	220	E A 220	225	210	225	250	205	E S 250	250	E C 340
5	270	250	245	235	E B 315	350	270	215	210	240	220	E A 240	A	A	A	A	235	205	225	250	205	215	275	320
6	300	305	300	280	E A 295	280	I A 260	205	H 200	H 175	220	H 195	240	240	210	200	195	225	225	225	225	225	230	265
7	260	275	255	250	225	220	250	225	225	225	225	200	H 200	220	245	220	215	210	210	E S 265	230	H 200	255	E C 300
8	E C 330	290	250	255	250	200	E S 300	245	225	200	H 200	220	H 195	H 200	210	H 200	H 200	205	H 185	H 200	E A 250	250	250	275
9	250	275	230	230	225	255	275	225	230	215	210	185	H 180	205	190	180	230	215	210	240	230	215	230	250
10	230	290	265	290	300	255	250	215	230	215	215	210	H 200	200	185	235	H 200	200	195	265	215	245	E S 250	320
11	345	300	265	230	220	200	C	215	205	H 170	H 180	H 175	210	205	E A 230	195	220	210	200	A	280	255	250	300
12	305	300	265	240	240	E B 280	275	210	215	230	H 180	200	H 175	H 175	190	H 200	225	205	195	235	215	225	250	E A 250
13	300	300	260	250	270	245	200	240	195	H 190	H 180	230	235	225	200	210	I C 210	200	225	E A 250	240	285	250	225
14	240	275	300	255	245	230	E S 255	215	210	225	200	H 200	205	190	H 190	230	210	190	200	225	250	230	250	250
15	305	320	300	275	230	220	225	230	H 195	H 180	240	H 225	200	H 190	H 175	H 205	215	210	195	210	220	215	220	E S 280
16	E S 335	E S 345	285	245	225	215	E S 295	220	220	200	210	190	240	H 215	H 200	215	200	200	200	235	200	250	210	260
17	300	300	290	260	220	E S 260	E S 250	240	220	H 215	H 205	205	215	200	205	205	200	235	200	205	220	210	235	240
18	305	300	250	245	255	205	H 190	225	215	215	205	H 190	H 180	H 190	230	215	225	205	200	235	205	250	225	280
19	315	300	265	240	210	210	E S 320	230	220	195	H 190	200	H 190	H 200	225	185	235	210	195	215	250	240	220	275
20	300	320	290	240	E B 305	E S 340	225	225	220	230	I C 230	240	H 215	I A 210	H 195	250	225	225	205	205	250	275	240	250
21	320	325	275	255	280	250	225	265	250	H 225	225	210	200	240	H 200	225	230	205	210	220	200	250	230	E A 305
22	E S 340	315	295	240	210	E S 350	E S 350	235	235	215	220	205	H 200	205	I A 230	I A 220	I A 210	230	210	205	205	250	295	300
23	315	300	250	260	240	225	280	235	235	H 215	205	H 180	200	230	H 205	I A 220	H 190	220	190	225	225	255	250	250
24	225	275	275	260	240	230	265	215	235	235	230	215	225	205	220	190	195	210	200	225	240	250	250	275
25	340	320	300	220	205	E S 350	S	235	210	220	225	H 205	E A 240	200	200	215	240	210	190	190	205	265	255	270
26	265	305	285	235	210	205	E S 300	255	245	230	H 210	215	205	240	H 190	250	230	225	H 190	H 200	225	245	H 215	E S 290
27	E S 300	305	270	255	240	195	250	275	210	250	230	235	225	240	A	220	215	210	200	230	250	215	230	S
28	350	350	305	260	230	200	S	250	210	200	240	H 200	210	H 200	200	250	225	210	205	E A 290	235	230	205	250
29	300	305	300	280	240	210	200	210	205	180	240	210	H 200	200	200	220	220	210	205	200	250	245	245	250
30	E S 305	300	300	285	245	210	250	245	210	210	225	215	205	200	220	220	235	210	185	225	255	205	225	235
31	250	280	295	290	250	E S 250	255	220	220	215	H 180	H 185	250	H 255	I A 210	215	235	230	205	205	200	250	250	E S 310
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	28	31	31	31	31	31	30	30	29	30	31	31	31	30	31	30	31	30
MED	295	300	285	255	240	U 228	248	230	220	215	210	200	204	202	205	215	225	210	200	225	225	244	242	262
UQ	310	308	300	278	256	255	274	238	225	225	225	214	215	220	220	220	230	215	210	240	242	250	250	E E 300
LQ	258	290	265	240	225	210	235	218	210	200	200	H 192	H 200	H 200	200	200	210	205	195	205	205	225	230	250

DEC. 1973 | H'F (KM)

IONOSPHERIC DATA

DEC. 1973 | H'ES (KM) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 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	C	C	C	C	C	S	S	100	110	105	105	100	G	105	100	G	100	100	95	100	115	95	S	S
2	C	S	105	100	C	105	S	100	100	G	105	125	105	110	105	100	110	100	100	100	S	S	S	S
3	S	S	C	C	C	S	S	S	105	105	105	100	100	100	100	100	100	100	95	110	C	C	C	100
4	110	S	100	100	C	S	105	110	125	110	105	105	105	105	G	105	100	100	100	100	100	S	S	C
5	S	S	100	100	120	S	S	S	115	125	125	120	110	105	105	105	105	100	100	100	100	100	100	100
6	100	100	95	110	105	100	100	100	100	100	100	100	100	155	100	100	100	100	100	95	100	S	100	100
7	S	S	S	C	C	S	S	145	145	145	145	150	105	105	100	150	100	100	100	S	95	S	S	C
8	C	S	C	100	105	B	S	S	130	130	115	120	115	105	105	105	105	100	100	100	100	S	100	100
9	S	S	C	C	C	S	S	S	115	110	110	120	105	105	105	105	G	100	100	S	C	C	C	C
10	S	C	S	C	C	100	C	S	120	G	105	105	105	100	100	100	100	S	100	S	100	S	S	S
11	120	B	110	B	B	B	C	S	G	G	G	100	100	100	105	115	105	100	100	100	95	95	95	95
12	S	100	S	B	B	B	S	S	G	G	110	105	100	120	100	100	100	100	100	S	S	S	S	S
13	S	C	C	C	100	100	S	100	G	G	G	105	105	105	100	100	C	100	100	100	S	S	S	S
14	S	S	S	S	B	S	S	S	G	150	105	105	105	105	G	100	G	S	100	100	S	S	S	S
15	S	S	S	S	S	S	S	S	105	G	155	145	100	100	100	100	100	S	S	S	S	S	S	S
16	S	S	S	B	B	S	S	S	G	170	105	105	155	100	105	100	100	S	S	135	100	100	S	S
17	100	100	100	S	B	S	S	S	G	G	115	105	105	100	100	G	G	100	100	100	S	S	S	S
18	S	S	S	S	S	S	S	S	G	105	105	115	105	130	G	155	105	S	S	S	100	S	S	S
19	S	S	S	S	S	S	S	S	G	130	140	110	110	105	170	100	G	S	S	S	S	S	S	S
20	S	S	S	100	B	100	S	S	120	G	C	150	140	130	100	100	150	100	100	100	S	S	S	S
21	S	S	B	B	E	S	S	S	G	110	115	175	150	110	175	155	160	150	95	S	S	S	S	105
22	105	105	105	105	S	S	S	S	G	G	G	125	110	105	105	105	100	100	100	100	S	100	S	S
23	S	S	S	S	S	105	S	S	G	100	G	110	175	140	130	105	110	100	100	100	S	S	S	S
24	S	S	95	95	100	S	S	S	G	110	155	150	130	125	125	100	G	S	S	S	S	S	S	S
25	105	105	S	S	S	110	S	S	G	G	105	145	110	105	105	105	100	100	S	120	120	S	100	S
26	S	S	100	100	100	S	S	S	G	G	175	155	135	125	150	110	100	95	130	125	130	S	S	S
27	100	100	S	S	S	S	S	105	G	G	G	150	150	150	120	105	100	160	140	S	S	100	S	S
28	S	S	S	S	S	S	100	100	G	G	150	150	125	105	105	100	100	100	100	100	100	100	S	100
29	S	S	S	S	S	100	100	100	G	110	170	150	105	105	100	100	100	S	100	100	S	S	S	S
30	S	S	S	130	125	S	S	S	120	115	130	115	115	105	105	G	G	S	S	S	S	S	S	S
31	100	S	105	S	E	S	S	S	G	G	120	120	G	105	120	115	120	115	115	S	S	110	110	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	8	6	10	10	7	8	4	9	13	17	25	31	29	31	28	28	24	22	24	19	13	8	6	7
MED	102	100	100	100	105	100	100	100	115	110	115	120	105	105	105	102	100	100	100	100	100	100	100	100
UQ	108	105	105	105	112	105	102	105	120	130	140	148	125	115	112	105	105	100	100	100	100	100	100	100
LQ	100	100	100	100	100	100	100	100	105	105	105	105	105	105	100	100	100	100	100	100	100	98	100	100

DEC. 1973 | H'ES (KM)

IONOSPHERIC DATA

DEC. 1973 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio 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 1	C 1	C 2	L 2	L 1		LL 21	L 1		L 3	L 1	F 3	F 1	F 2	F 1		
2			F 1	F 2		F 1		L 1	L 2		L 1	H 1	L 1	CL 11	L 1	L 1	LH 13	L 1	F 2	F 1				
3									L 2	L 2	L 2	L 1	L 2	L 2	L 3	L 1	L 1	L 2	F 3	F 2				F 1
4	F 1		F 2	F 1			F 2	L 1	HL 11	L 2	L 1	L 2	L 2	L 1		L 2	L 2	L 3	F 4	F 2	F 2			
5			F 2	F 1	F 1				C 1	H 2	H 1	C 2	C 2	C 3	C 3	C 2	L 3	L 2	F 3	F 1	F 1	F 2	F 2	F 3
6	F 1	F 1	F 1	F 1	F 2	F 2	F 3	L 1	L 3	L 2	LH 21	L 2	L 2	HL 12	L 2	L 1	L 1	L 1	F 4	F 2	F 1		F 1	F 1
7								H 1	H 2	H 2	HL 11	H 1	C 1	CL 22	C 2	H 1	L 2	L 1	F 1		F 2			
8				F 2	F 1				H 2	H 2	C 2	C 1	CL 11	C 2	C 2	C 1	L 3	L 1	F 1	F 1	F 3		F 1	F 1
9									C 3	CL 21	C 1	CL 11	L 2	L 2	L 1	L 2		L 1	F 1					
10						F 1			C 3		L 2	L 1	L 1	L 2	L 2	L 2	L 1		F 1		F 1			
11	F 1		F 1									L 1	L 2	L 2	L 2	C 1	L 3	L 3	F 1	F 4	F 2	F 3	F 2	F 3
12		F 1									C 1	C 1	L 1	CL 11	L 1	L 2	L 1	L 1	F 1					
13					F 1	F 1		L 1				L 1	L 1	L 1	L 1	LH 21		L 1	F 3	F 1				
14										H 1	L 1	L 1	L 1	L 1		L 1			F 1	F 1				
15									L 1		HL 22	HL 11	L 1	L 2	L 2	L 1	L 1							
16										HL 11	LH 11	L 1	HL 12	L 2	L 1	L 1	LH 21			F 2	F 1	F 1		
17	F 1	F 1	F 1								C 1	C 2	L 2	L 2	L 1			L 1	F 1	F 1				
18										L 2	L 2	C 1	L 1	H 1		HL 12	L 1				F 1			
19										HC 11	H 1	C 1	C 1	L 2	HL 12	L 1								
20				F 1		F 1			C 1			H 1	HL 22	H 2	L 2	L 2	HL 31	L 2	F 1	FF 21				
21										C 2	C 2	HL 11	H 1	CL 31	HHL 11	HL 11	H 1	H 1	F 1					F 7
22	F 2	F 2	F 2	F 1								C 1	C 1	C 1	L 4	L 3	L 3	L 3	F 3	F 2		F 1		
23						F 1				L 1		C 1	H 1	H 2	HC 11	LH 22	CL 22	L 2	F 1	F 1				
24			F 2	F 1	F 1					L 1	HL 22	HL 12	HL 22	HL 22	HL 22	LH 21								
25	F 2	F 1				F 1					L 1	H 1	C 2	C 2	L 2	L 3	L 2	L 2		F 1	F 4		F 1	
26			F 1	F 1	F 1						H 1	H 1	H 1	HC 21	C 2	C 3	L 3	L 3	F 2	F 6	FF 11			
27	F 2	F 2						L 2				HL 21	H 1	H 1	H 1	LL 21	L 1	H 1	F 1			F 1		
28							F 1	L 1			H 1	H 1	H 1	C 1	L 2	L 3	L 2	L 2	F 3	F 4	F 3	F 1		F 1
29						F 1	F 1	L 1		L 2	HL 11	HL 11	L 1	L 1	L 1	L 2	L 1		F 1	F 1				
30				F 1	F 1				L 1	CH 11	H 1	C 2	C 2	L 2	L 2									
31	F 1		F 2								C 1	C 1		L 1	CL 11	C 2	C 2	C 3	F 1			F 1	F 1	
	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																								

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DEC. 1973 | TYPES OF ES

IONOSPHERIC DATA

DEC. 1973 | FOF2 (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26 19.0 N. Long. 127 46.8 E Sweep 1 MHz to 25 MHz in 30 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	25	S 28	28	32	34	28	S 26	40	71	65	68	81	99	117	112	99	87	80	71	49	60	40	32	25
2	26	28	29	30	34	S 35	23	40	62	72	S 72	83	94	114	124	127	118	R 85	J S 56	64	R 58	45	30	27
3	25	27	28	31	31	28	28	43	S 60	74	84	76	R 72	80	86	78	81	70	52	45	46	53	50	33
4	33	29	30	26	23	22	23	44	62	63	67	68	86	104	107	93	102	94	S 76	U R 77	76	U S 39	31	29
5	27	25	J S 28	24	24	26	F	47	50	62	121	85	69	79	87	72	76	74	44	48	66	37	33	22
6	S 25	27	27	26	27	I S 26	S 27	40	50	70	86	98	92	108	124	86	92	90	78	65	54	41	33	32
7	25	25	27	30	S 34	S	18	C	C	67	71	74	72	74	93	76	60	56	41	40	36	S 47	30	J S 28
8	23	24	29	J S 28	35	H 21	17	31	61	66	98	94	114	116	124	102	82	61	49	38	39	40	31	30
9	26	28	32	34	22	23	20	34	62	67	84	80	81	106	85	60	80	83	59	49	50	S 47	S 49	S 51
10	45	S 40	S 35	S 36	32	S 36	30	S 42	57	68	78	92	74	84	70	78	90	83	45	26	31	26	20	21
11	24	25	27	30	32	22	21	31	52	R 64	76	94	79	78	83	77	64	S 64	64	42	S 39	47	U S 40	32
12	30	29	33	37	S 37	21	23	37	51	62	78	86	74	106	114	93	86	73	60	I C 46	51	43	33	32
13	30	29	34	37	39	U S 35	S 28	31	55	64	60	80	97	104	R 114	140	112	75	64	44	44	43	44	52
14	39	25	24	25	27	25	21	33	50	C	C	86	98	88	112	R 118	132	95	59	37	36	31	30	26
15	25	24	26	31	43	23	23	34	50	55	73	73	60	90	86	74	72	71	62	49	40	45	S 39	33
16	32	30	33	38	40	26	25	34	56	65	68	69	60	90	110	98	104	82	61	47	51	31	R 37	29
17	R 32	28	28	28	33	R 26	22	32	57	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	52	44	S 45	37	26	23
19	24	24	F 27	F 29	S 40	S 27	S 21	32	57	71	72	68	67	75	79	75	82	85	70	53	39	43	38	37
20	33	30	31	37	28	27	34	32	51	67	80	94	100	110	85	84	94	65	65	62	46	48	49	33
21	28	30	35	S 38	F 28	S 28	S 28	33	68	90	73	78	75	80	89	87	81	72	54	58	55	44	54	31
22	31	32	38	43	S 22	S 18	20	40	56	81	122	91	89	92	110	130	102	85	94	62	60	63	54	46
23	38	46	44	33	36	24	22	34	69	88	78	69	74	105	86	79	87	J R 92	54	52	45	47	50	52
24	48	35	34	31	35	24	23	U R 37	59	71	88	86	85	80	91	89	82	75	58	44	S 40	S 37	29	26
25	25	26	27	34	34	S	S	27	52	65	76	93	100	I R 134	I R 147	J R 151	R 130	155	R 111	66	42	A	I A 38	33
26	32	27	28	31	31	19	17	27	51	72	76	65	73	90	95	102	106	98	96	V 51	S 43	39	36	24
27	27	25	27	U S 28	31	24	20	26	50	72	R 107	105	R 108	128	I R 127	117	112	91	70	50	41	42	43	U S 35
28	22	22	26	U S 34	43	20	18	28	51	54	88	74	73	112	137	139	140	121	87	S 52	59	51	46	31
29	26	28	30	30	37	24	23	34	49	53	61	76	86	95	102	100	87	96	82	44	41	43	31	27
30	25	24	27	28	29	30	18	27	61	61	68	79	67	82	95	107	127	131	127	S 76	70	74	84	56
31	37	27	27	26	30	27	20	30	55	65	61	61	87	91	91	86	66	80	67	43	35	29	24	22
	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	28	28	29	29	28	28	29	29	29	29	29	29	29	30	30	30	29	30	30
MED	27	28	28	31	32	26	22	34	56	66	76	80	81	92	95	93	87	83	63	49	45	43	36	31
UQ	32	29	33	34	36	28	26	40	61	72	85	91	94	108	114	107	106	92	76	58	55	47	46	33
LQ	25	25	27	28	28	22	20	31	51	64	70	74	73	82	86	78	81	73	54	44	40	39	31	26

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DEC. 1973 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 FOF1 (0.1 MHZ) 135 E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26 19.0 N. Long. 127 46.8 E Sweep 1 MHz to 25 MHz in 30 sec in automatio 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	U L 470	L 460	L 460	L 420	L	L							
2									L	L	L	L 430	L 440	L 430	L	L	L							
3									L	L	L 450	L	L	L	L	L	L							
4									L	L	L	L	L	L	L	L	A							
5										L	L	L	L 420	L	L	L	L							
6										L	L	L	L 420	L	430	L	L							
7										L	L	420	L 430	L 430	L	L	L							
8									L		L	L	L	A	L	L								
9									L	L	L	L	L	L 420	L	L	L							
10									L	L	L	L	L	L	L	L	L							
11									L	L	L 430	L	L	L	L 410	U L 370	L							
12										L	L	L	L 410	430	L	L	L							
13										L	L	L	L	L	L	L	L							
14										C	C	L 430	L	L	L 430	L	L	A						
15											L	L	L	L 450	L	L	L							
16										L	L	L	L 430	L	L	L	L							
17										C	C	C	C	C	C	C	C							
18									C	C	C	C	C	C	C	C	C							
19										L	L	L	L	L	L	L	L	L						
20											L	L	L	L	L	L	L							
21										L	L	L	L	L	L	L	L							
22									L	L	L 430	L	450	A	A	L	L							
23										L	L	L	L	L	L	L	L							
24										L	L	L	430	L	L	L	L							
25										L	L	L 440	L 460	L	L 460	L	L							
26										L	L	L	L 460	U L 450	L 450	L	L							
27										L	L	L 440	L 470	L 470	A	L	L							
28										L	L	L 430	U L 450	450	L 430	L	L							
29										L	L	L	440	450	L	L	L							
30										L	L	L 430	L 440	L	L	L	L	L						
31										L	L 410	L	L 440	L	L	L	L 350							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											4	8	16	10	7	1	1							
MED											L 430	L 430	L 440	L 450	L 430	U L 370	L 350							
UQ											L 440	L 440	L 455	L 450	L 440									
LQ											L 420	L 430	L 430	L 430	L 425									

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DEC. 1973 FOF1 (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26 19.0 N. Long. 127 46.8 E Sweep 1 MHz to 25 MHz in 30 sec in automatio 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	220	270	300	320	A	A	A	295	250	180	S					
2								S	A	A	300	320	330	320	315	295	240	175	S					
3								S	A	A	300	320	325	325	310	280	240	A						
4								S	A	A	A	A	A	A	A	A	A	A						
5								S	A	A	A	A	A	A	A	A	A	160						
6								S	205	250	275	I A 290	R 300	300	295	280	240	180	S					
7								C	C	250	285	A	A	A	A	280	235	175						
8								S	220	260	I A 290	I A 300	310	I A 320	345	I A 335	280	A						
9								S	A	A	A	A	A	A	A	255	240	175						
10								S	215	A	290	A	310	A	A	A	I A 260	A						
11								S	A	270	290	305	325	310	A	A	R 240	A						
12								B	200	A	A	305	A	295	335	A	A	220						
13								S	210	265	A	A	350	A	A	280	245	A						
14								S	A	C	C	A	A	A	A	280	245	A						
15								S	170	285	290	A	A	A	A	290	240	170						
16								S	170	260	300	A	A	A	310	285	240	A						
17								S	200	C	C	C	C	C	C	C	C	C						
18								C	C	C	C	C	C	C	C	C	C	C						
19								S	235	275	I A 320	A	A	A	310	290	240	160						
20								S	170	250	320	320	320	A	335	A	240	205						
21								S	190	255	A	315	R 325	R 330	I A 310	290	245	A						
22								S	195	245	300	A	A	A	A	A	240	215						
23								S	200	255	A	320	330	A	A	A	305	A						
24								S	210	265	A	A	A	320	305	290	255	180						
25								S	185	255	295	310	325	A	A	I A 290	A	A						
26								S	195	255	290	295	A	A	A	290	260	195						
27								S	210	A	290	A	A	A	A	300	260	A	S					
28								S	200	250	280	310	A	A	A	290	I A 270	225						
29								160	195	255	280	300	320	320	310	290	250	U R 190	B					
30								S	190	240	280	A	A	A	A	295	A	A						
31								S	S	220	255	A	A	300	290	275	A	A	S					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	21	20	20	14	12	10	12	21	23	15						
MED								160	200	255	290	310	325	320	310	290	245	180						
UQ									210	265	300	320	328	320	325	290	258	200						
LQ									190	250	282	300	315	300	308	280	240	175						

The Radio Research Laboratories, Japan

DEC. 1973 | FOE (0.01 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station OKINAWA Lat. 26° 19.0' N. Long. 127° 46.8' E Sweep 1 MHz to 25 MHz in 30 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E S 16	E S 16	E S 16	E S 15	E S 16	E S 15	E S 16	G	G 23	29	33	40	33	35	J X 38	G 23	G 17	G	E S 14	E S 15	E B 18	E S 16	M 17	J X 19
2	E S 16	E S 15	E S 16	E S 15	J X 21	J X 18	M 17	M 22	G	J X 37	32	G	G	G	35	J X 26	J X 38	J G 20	J X 19	E S 15	E S 16	M 19	E S 15	E S 16
3	M 19	E S 16	E S 16	E S 15	E B 12	E S 16	M 18	M 21	J X 23	28	J G 30	G 24	G	G	G	J G 28	29	J X 24	20	E S 16	E S 16	E S 16	E S 16	E S 16
4	E S 16	E S 16	M 18	M 18	M 18	M 24	M 18	E S 16	J X 29	J X 50	J X 38	J X 64	J X 49	J X 65	J X 59	J X 40	J X 54	J X 54	J X 33	M 25	M 26	M 20	M 17	E S 16
5	M 20	M 18	M 18	E S 16	J X 18	E S 16	E S 16	E S 15	26	J X 34	30	35	40	J X 49	34	30	24	G	E S 14	E S 16	E S 16	E S 16	E S 16	E S 16
6	E S 16	J X 26	M 25	J X 26	J X 20	J X 33	J X 24	M 23	G 19	32	31	J X 40	32	J X 49	G	G 22	G	23	E S 14	E S 15	E S 15	E S 16	E S 15	E S 16
7	E S 15	E S 16	E S 16	E S 15	E S 16	S	E S 16	C	C	30	35	J X 32	33	32	J X 35	J X 29	J G 23	G 18	J X 24	J X 20	M 21	E S 16	E S 16	E S 16
8	E S 16	E S 15	E S 16	E S 16	J X 19	M 21	M 22	E S 16	24	G	31	33	34	J X 42	G 33	35	J X 33	J X 29	J X 29	J X 26	M 19	M 21	M 21	M 22
9	M 20	M 20	E S 16	E S 16	E S 16	M 18	E S 16	E S 16	25	32	J X 43	40	37	J X 40	J X 56	28	J X 34	G	E B 14	E S 15	E S 16	E S 16	E S 16	E S 16
10	E S 16	E S 16	E S 16	E S 15	E B 12	M 20	M 23	J X 21	G	29	G 28	33	G 30	J X 34	J X 37	J X 34	J X 42	23	J X 26	E S 16	M 20	E S 16	E S 16	E S 16
11	E S 16	E S 16	E S 15	E S 15	E B 12	E S 15	E S 16	E S 15	J X 25	G 25	G 29	G 31	35	J G 31	J X 34	30	J X 26	J X 24	J X 29	J X 28	M 26	17	J X 25	J X 18
12	E S 16	E S 16	E S 15	M 18	M 18	M 18	E B 14	E B 13	G	J X 29	J X 36	32	J X 30	38	J X 38	J X 31	J X 39	G	J X 29	M 25	J X 20	J X 17	M 19	E S 16
13	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	G	G	J X 33	33	G 33	J X 40	J X 53	J X 31	J X 27	J X 37	J X 30	J X 24	J X 20	E S 16	E S 16	E S 16
14	E S 16	E S 16	E S 15	E S 16	E B 12	E B 12	E S 16	E B 13	23	C	C	J X 37	J X 38	J X 37	J X 36	J X 33	J X 29	J X 44	J X 40	J X 32	J X 19	M 17	M 19	M 20
15	M 18	E S 16	E S 16	E S 16	E S 15	E B 12	E S 16	E S 16	J G 18	32	J X 36	35	J X 38	J X 37	J X 55	J X 31	J X 34	J X 24	J X 19	M 20	M 20	M 18	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	34	34	J X 40	36	J X 39	J X 40	J X 33	J X 40	20	J X 23	M 17	J X 24	E B 18	E S 16	E S 16
17	E B 21	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E B 19	E B 21	E B 20	E S 16	M 17	E S 16
19	E S 16	E S 16	E S 16	E S 16	E S 15	E S 15	E B 14	E S 16	21	G	M 35	J X 37	J X 40	J X 36	J X 39	J X 31	J X 30	24	M 19	E S 15	E S 16	E S 16	E S 16	M 19
20	E S 16	E S 16	E S 15	E S 16	E S 15	E B 13	E S 15	M 20	G	J G 29	J G 30	36	40	36	34	J X 36	30	24	J X 22	M 22	M 22	M 20	M 18	E S 16
21	E S 16	E S 16	E S 16	E S 15	E S 15	E S 15	E S 16	E S 15	G	G	33	34	G	G	28	J X 37	31	25	M 22	18	J X 23	E S 16	E S 16	J X 21
22	J X 26	J X 22	E B 13	E S 16	E B 12	E S 16	M 23	M 20	G	G 23	G 26	J X 42	J X 49	J X 60	J X 57	J X 34	30	J X 54	J X 40	J X 18	J X 17	J X 18	E S 16	E S 16
23	E S 16	E S 16	E B 13	E S 16	E S 16	E S 16	E S 16	M 20	28	G 26	31	G	G	39	39	J X 36	J X 32	26	J X 27	J X 20	M 22	M 18	E S 15	E S 15
24	E S 16	E S 16	E S 16	E B 13	E S 15	E B 14	E S 16	E S 16	G	G	35	J X 41	38	38	34	J X 30	J X 27	G 17	E S 15	E S 15	E S 16	E S 15	M 18	E S 15
25	E S 16	J X 18	M 17	E S 15	E S 15	S	S	E S 15	G	30	G	34	J X 46	J X 51	J X 46	J X 48	J X 48	J X 35	J X 29	M 22	J X 20	J X 43	J X 38	J X 18
26	J X 18	M 22	M 17	E S 15	E S 15	E B 12	E S 15	E S 16	G	G	31	37	41	J X 64	J X 54	J G 29	J X 32	G 19	J X 20	E S 15	E S 15	E B 13	E S 16	J X 20
27	E S 16	E S 15	E S 15	E S 16	E B 12	J X 20	E S 15	E S 16	G	G 27	G 28	34	39	38	J X 47	G	32	34	J X 22	J X 34	J X 24	E S 16	E B 13	E S 15
28	E S 15	E S 15	E S 16	E S 15	E S 16	E B 14	E S 15	E S 15	G	G	33	41	40	J X 40	31	G 26	J X 28	J X 34	J X 38	J X 36	M 18	E S 15	E B 19	E S 16
29	E S 16	E S 16	E S 16	E S 15	E S 14	E S 15	E S 15	G	G	G	31	33	G	G	J G 24	J G 26	J X 34	G 16	E B 13	E B 14	E S 16	E S 15	E S 15	E S 16
30	E S 15	E B 13	E S 16	E S 15	E S 15	E B 13	E S 15	E S 15	G	27	31	J X 45	J X 36	35	J X 44	J X 31	26	19	E S 15	E S 15	E S 15	E B 13	E S 16	J X 26
31	E S 16	E S 15	E S 15	E S 16	M 18	E S 15	E S 16	E S 16	J G 19	J G 35	32	34	34	33	34	29	29	21	E S 15	E S 16	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	30	30	30	30	30	28	29	29	29	28	28	29	29	29	29	29	29	29	30	30	30	30	30	30
MED	E S 16	E S 16	E S 16	E S 16	E S 16	E 16	E S 16	E S 16	G	28	32	35	36	J X 38	J X 37	J X 31	J X 30	24	J X 22	18	18	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	18	E S 16	E S 16	23	32	34	J X 40	40	J X 40	J X 46	J X 34	J X 34	J X 29	J X 29	J X 24	M 21	18	M 18	18
LQ	E S 16	E S 16	E S 15	E S 15	E S 15	E E 14	E S 15	E S 15	G	G	30	33	32	34	34	28	27	G 19	E E 15	E S 15	E S 16	E S 16	E S 16	E S 16

The Radio Research Laboratories, Japan

DEC. 1973 | FOES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | FBES (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26 19.0 N. Long. 127 46.8 E Sweep 1 MHz to 25 MHz in 30 sec in automatio operation

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

The Radio Research Laboratories, Japan

DEC. 1973 | FBES (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station OKINAWA Lat. 26° 19.0' N. Long. 127° 46.8' E Sweep 1 MHz to 25 MHz in 30 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E S 16	E A 16	E S 16	E S 15	E S 16	E S 15	E S 16	E S 15	15	15	16	20	19	18	18	15	14	14	E S 14	E S 15	18	E S 16	E S 16	E S 16
2	E S 16	E S 15	E S 16	E S 15	14	E S 16	13	E S 16	15	14	15	17	20	19	16	15	15	14	E S 16	E S 15	E S 16	E S 16	E S 15	E S 16
3	E S 16	E S 16	E S 16	E S 15	12	E S 16	E S 16	E S 16	15	14	15	15	16	20	20	17	14	14	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	13	E S 16	E S 16	E S 16	14	15	16	16	16	16	19	16	14	14	E S 15	E S 16	E S 15	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 15	14	16	15	16	17	17	17	15	15	15	14	E S 16	E S 16	E S 16	E S 16	E S 16
6	E S 16	E S 16	E S 15	E S 15	12	E S 15	E S 15	E S 16	14	14	16	17	16	15	16	16	17	16	E S 14	E S 15	E S 15	E S 16	E S 15	E S 16
7	E S 15	E S 16	E S 16	E S 15	E S 16	S	E S 16	C	C	15	15	16	15	16	16	15	14	14	E S 15	E S 15	E S 16	E S 16	E S 16	E S 16
8	E S 16	E S 15	E S 16	E S 16	11	E S 16	E S 16	E S 16	16	21	15	16	14	16	16	16	15	14	14	E S 15	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	15	16	14	14	15	14	15	14	15	14	14	E S 15	E S 16	E S 16	E S 16	E S 16
10	E S 16	E S 16	E S 16	E S 15	12	E S 15	E S 16	E S 16	15	15	16	16	16	16	16	14	15	14	14	E S 16	E S 16	E S 16	E S 16	E S 16
11	E S 16	E S 16	E S 15	E S 15	12	E S 15	E S 16	E S 15	15	14	15	15	17	18	15	15	14	13	14	E S 15	E S 15	E S 16	E S 15	E S 16
12	E S 16	E S 16	E S 15	12	13	13	14	13	14	14	16	14	15	15	16	15	16	17	11	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 15	E S 16	E S 16	14	14	15	15	15	16	17	15	14	14	14	E S 15	E S 16	E S 16	E S 16	E S 16
14	E S 16	E S 16	E S 15	E S 16	12	12	E S 16	13	14	C	C	15	14	14	16	14	14	14	13	15	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 15	12	E S 16	E S 16	14	14	14	14	14	16	16	16	14	E S 15	14	E S 16	E S 15	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	15	14	16	17	17	22	23	18	14	18	E S 15	E S 15	E S 16	18	E S 16	E S 16
17	21	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	19	21	20	E S 16	E S 16	E S 16
19	E S 16	E S 16	E S 16	E S 16	E S 15	E S 15	14	E S 16	15	18	14	19	16	16	18	14	14	14	14	E S 15	E S 16	E S 16	E S 16	E S 16
20	E S 16	E S 16	E S 15	E S 16	E S 15	13	E S 15	E S 16	14	15	17	17	17	20	20	17	17	16	13	E S 15	E S 16	E S 15	E S 16	E S 16
21	E S 16	E S 16	E S 16	E S 15	E S 15	E S 15	E S 16	E S 15	14	15	16	18	19	18	18	17	14	14	14	11	13	E S 16	E S 16	E S 15
22	14	12	13	E S 16	12	E S 16	E S 16	E S 15	14	16	16	19	18	20	15	15	16	14	14	14	E S 15	E S 15	E S 16	E S 16
23	E S 16	E S 16	13	E S 16	E S 16	E S 16	E S 16	E S 16	14	15	15	19	20	22	20	21	16	E C 21	12	14	14	E S 16	E S 15	E S 15
24	E S 16	E S 16	E S 16	13	E S 15	14	E S 16	E S 16	15	14	15	17	17	19	16	17	14	14	E S 15	E S 15	E S 16	E S 15	E S 15	E S 15
25	E S 16	E S 16	E S 15	E S 15	E S 15	S	S	E S 15	14	14	16	16	18	20	E C 22	15	14	13	13	14	E S 15	14	E S 15	13
26	E S 16	13	E S 15	E S 15	E S 15	12	E S 15	E S 16	14	20	14	15	16	16	16	17	15	13	13	E S 15	E S 15	13	E S 16	13
27	E S 16	E S 15	E S 15	E S 16	12	E S 15	E S 15	E S 16	13	14	18	19	20	21	22	19	18	13	E S 15	E S 16	E S 16	E S 16	13	E S 15
28	E S 15	E S 15	E S 16	E S 15	E S 16	14	E S 15	E S 15	15	15	18	20	E C 29	20	20	20	14	14	14	14	E S 16	E S 15	19	E S 16
29	E S 16	E S 16	E S 16	E S 15	E S 14	E S 15	E S 15	12	14	15	20	18	17	18	15	14	14	13	13	14	E S 16	E S 15	E S 15	E S 16
30	E S 15	13	E S 16	E S 15	E S 15	13	E S 15	E S 15	14	14	14	16	17	16	19	17	17	16	E S 15	E S 15	E S 15	13	E S 16	E S 15
31	E S 16	E S 15	E S 15	E S 16	14	E S 15	E S 16	E S 16	E S 17	16	18	19	19	18	16	16	15	16	E S 15	E S 16	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	30	30	30	30	30	28	29	29	29	28	28	29	29	29	29	29	29	29	30	30	30	30	30	30
MED	E S 16	E S 16	E S 16	E S 16	E S 15	E S 15	E S 16	E S 16	14	15	16	16	17	18	16	16	14	14	14	E S 15	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	15	16	16	18	18	20	19	17	15	14	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16
LQ	E S 16	E S 15	E S 15	E S 15	12	13	E S 15	E S 15	14	14	15	15	16	16	16	15	14	14	14	E S 15	E S 15	E S 15	E S 15	E S 16

The Radio Research Laboratories, Japan

DEC. 1973 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26° 19.0' N. Long. 127° 46.8' E Sweep 1 MHz to 25 MHz in 30 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	305	290 S	300	320	340	320	265 S	330	350	350	340	310	330	350	355	340	350	330	370	310	340	310	350	275
2	280	300	290	290	320	370 S	310	330	350	360	330 S	340	300	350	320	340	350	310 R	340 J S	340	350 R	370	320	300
3	300	290	310	300	320	280	300	340	370 S	370	370	350	320 R	320	340	340	370	360	370	310	300	320	360	330
4	300	310	320	360	330	340	290	370	380 S	380	370	325	330	340	360	320	340	340	320 S	315 U S	360	330 U S	330	320
5	340	310	320 J S	330	275	280	F	370	360	310	340	360	330	320	350	340	350	355	340	285	370	340	370	275
6	270 S	285	290	310	330	315 I S	330 S	360	360	330	340	350	310	320	350	310	330	340	330	370	350	350	310	330
7	310	300	310	330	370 S	S	280	C	C	360	350	350	350	330	350	340	370	360	360	320	300	370 S	330	320 J S
8	290	280	310	360 J S	340	390 H	290	310	360	315	345	340	360	330	340	340	330	360	350	335	310	320	330	325
9	310	290	320	395	330	350	320	340	360	340	360	350	340	365	345	335	345	375	350	335	315	310 S	300 S	300 S
10	350	280 S	300 S	300 S	280	330 S	320	340 S	370	350	350	370	345	355	315	315	335	390	360	350	325	355	310	275
11	290	300	310 S	340	390	410	290	360	360	360 R	330	370	330	330	350	370	370	370 S	370	340	320 S	330	350 U S	310
12	300	300	320	360	380 S	280	300	350	370	350	340	320	330	380	320	340	355	350	300	315 I C	355	360	300	350
13	285	295	320	325	305	350 S	360 S	330	340	365	330	330	340	355	330 R	350	355	380	365	350	310	285	330	330
14	340	280	305	305	345	350	325	340	375	C	C	345	360	320	335	360 R	365	355	380	360	320	320	330	360
15	300	290	290	300	370	350	310	345	390	365	360	380	350	325	340	340	350	350	370	360	330	350	290	310
16	290	280	310	335	360	335	360	310	360	370	365	395	295	310	345	345	340	380	350	320	350	290	305	320
17	340 R	300	310	300	350	375 R	345	320	370	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	340	320	380 S	370	280	320
19	315	300	320 F	340 F	340 S	330 S	295 S	330	365	340	360	325	355	350	340	335	345	360	350	335	305	310	330	325
20	300	280	290	350	305	275	320	315	340	335	325	340	340	360	350	330	360	390	360	380	310	295	350	330
21	290	275	315	350 S	300 F	320 S	325 S	300	330	370	370	345	340	340	330	350	360	360	320	310	340	315	355	295
22	270	260	305	340	350 S	250 S	280	330	360	315	350	360	385	335	325	365	350	320	330	320	310	300	300	300
23	310	280	355	320	350	310	310	320	330	350	360	370	350	350	355	300	340	345 J R	340	330	320	295	320	325
24	330	300	310	320	340	320	285	320 U R	350	325	345	365	340	360	345	340	360	370	350	365	340 S	350 S	365	340
25	310	310	310	350	380	S	S	330	380	340	365	350	325	325 I R	310 I R	335 J R	335 R	360	380 R	385	290	A	345 I A	320
26	340	300	315	280	390	320	350	320	340	340	340	350	340	330	330	340	360	360	370	330 V	330 S	300	350	300
27	300	285	310	320 U S	365	360	420	310	330	320	340 R	350	315 R	310	345 I R	350	330	360	360	370	300	330	360	370 U S
28	290	270	320	330 U S	390	400	320	330	350	330	310	380	310	310	320	310	310	370	375	310 S	320	340	370	380
29	300	300	335	330	380	340	310	320	380	310	330	340	310	310	340	340	330	330	380	330	300	320	330	330
30	300	290	290	320	315	390	290	280	340	370	370	300	320	330	335	340	350 R	350	380	330 S	320	320	330	330
31	340	280	310	310	340	370	310	320	380	310	380	315	320	340	330	360	320	330	370	380	330	360	300	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	30	30	30	30	28	28	29	29	28	28	29	29	29	29	29	29	29	30	30	30	29	30	30
MED	300	290	310	328	340	338	310	330	360	345	348	350	330	330	340	340	350	360	360	332	320	320	330	320
UQ	315	300	320	340	370	365	325	340	370	362	362	360	345	350	350	345	360	370	370	360	340	350	350	330
LQ	290	280	305	310	320	318	290	320	350	328	340	340	320	320	330	335	335	345	340	320	310	310	310	300

The Radio Research Laboratories, Japan

DEC. 1973 | M(3000)F2 (0.01)

IONOSPHERIC DATA

DEC. 1973 | M(3000)F1 (0.01)

135° E Mean Time (G. M. T. + 9h)

Station OKINAWA Lat. 26° 19.0' N. Long. 127° 46.8' E Sweep 1 MHz to 25 MHz in 30 sec in automatio 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	U L 370	L 370	L 380	L 390	L	L							
2									L	L	L	L 400	L 400	L 370	L	L	L							
3									L	L	L 380	L	L	L	L	L	L							
4									L	L	L	L	L	L	L	L	A							
5										L	L	L	L 400	L	L	L	L							
6										L	L	L	L 390	L	370	L	L							
7										L	L	390	L 390	L 380	L	L	L							
8									L		L	L	L	A	L	L								
9									L	L	L	L	L	L 375	L	L	L							
10									L	L	L	L	L	L	L	L	L							
11									L	L	L 370	L	L	L 380	L 380	U L 400	L							
12										L	L	L	L 415	345	L	L	L							
13										L	L	L	L	L	L	L	L							
14										C	C	L 370	L	L	L 370	L	L	A						
15											L	L	L	L 380	L	L	L							
16										L	L	L	L 400	L	L	L	L							
17										C	C	C	C	C	C	C	C							
18									C	C	C	C	C	C	C	C	C							
19										L	L	L	L	L	L	L	L	L						
20											L	L	L	L	L	L	L							
21										L	L	L	L	L	L	L	L							
22									L	L	L 365	L	360	A	A	L	L							
23										L	L	L	L	L	L	L	L							
24										L	L	L	405	L	L	L	L							
25										L	L	L 380	L 385	L	L 370	L	L							
26										L	L	L	L 370	U L 380	L 380	L	L							
27										L	L	L 390	L 380	L 350	A	L	L							
28										L	L	L 400	U L 400	380	L 355	L	L							
29										L	L	L	320	370	L	L	L							
30										L	L	L 380	L 370	L	L	L	L	L						
31										L	L 400	L	L 350	L	L	L	L 420							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											4	8	16	11	7	1	1							
MED											L 375	L 385	L 388	L 380	L 370	U L 400	L 420							
UQ											L 390	L 395	L 400	L 380	L 380									
LQ											L 368	L 375	L 370	370	L 370									

The Radio Research Laboratories, Japan

DEC. 1973 | M(3000)F1 (0.01)

IONOSPHERIC DATA

DEC. 1973 | H'F2 (KM) | 135 E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26 19.0 N. Long. 127 46.8 E Sweep 1 MHz to 25 MHz in 30 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										245	255	295	275	235	245	250	230							
2									230	235	250	250	280	245	260	250	220							
3									225	235	245	245	270	250	265	250	230							
4									230	230	250	255	275	255	245	245	255							
5										280L	265	235	260	280	245	250	250							
6										275	270	240	270	300	240	240	245							
7									C	245	240	240	250	295	250	250	220							
8									250		250	250	235	260	240	240								
9									235	250	260	240	240	245	230	290	250							
10									230	240	245	235	245	240	270	280	230							
11									225	245	275	230	245	255	230	235	225							
12										250	270	240	270	270	235	240	225							
13										245	250L	275	260	235	245	240	220							
14										C	C	270	240	260	265	240	225	210						
15											260	230	240	280	250	260	240							
16										230	260	225	275H	300	250	260	240							
17										C	C	C	C	C	C	C	C							
18									C	C	C	C	C	C	C	C	C							
19										270L	240	250	245	250	270	260	240	220						
20											260	270	250	240	240	260	240							
21										230	240	250	260	250	250	240	230							
22									240	290	250	230	240	260	250	235	240							
23										240	230	240	250	250	220	240	240							
24										250	260	250	270	240	250	240	230							
25										250	250	255	260	280	255	270	240							
26										265	250	250	270	255	250	245	230							
27										300	260	235	245	260	230	225	240							
28										250	250	225	305	275	245	270	230							
29										235	225L	275	290	295	255	250	240							
30										240	250	260	275	265	250	240	230	210						
31										240	230	295	295	255	240	230	230							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									8	25	28	29	29	29	29	29	28	3						
MED									230	245	250	250	260	255	250	245	230	210						
UQ									238	250	260	255	275	275	250	260	240	215						
LQ									228	240	245	235	245	250	240	240	230	210						

The Radio Research Laboratories, Japan

DEC. 1973 | H'F2 (KM)

IONOSPHERIC DATA

DEC. 1973 | H'F (KM) | 135 E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26 19.0 N. Long. 127 46.8 E Sweep 1 MHz to 25 MHz in 30 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	Es 275	255	295	270	250	245	Es 260	245	240	220	210	220	H 195	245	205	H 190	H 200	210	200	200	220	215	225	Ea 350
2	305	305	310	300	265	220	225	250	230	210	205	H 200	H 200	H 180	225	215	215	200	195	200	200	200	220	Es 255
3	290	300	275	275	250	Es 280	280	245	210	200	215	210	190	H 195	H 180	H 190	240	215	200	195	225	245	210	220
4	240	275	255	210	270	Es 310	300	220	245	230	210	200	Ea 250	230	240	230	A	205	220	225	205	185	250	260
5	240	235	230	225	280	350	F 310	210	225	250	230	215	220	A	225	220	235	225	200	290	215	240	220	300
6	350	340	310	300	230	Is 270	230	210	220	235	220	240	205	200	210	210	H 210	225	215	205	210	220	225	230
7	250	280	275	245	210	S	Es 420	C	C	240	225	210	195	180	H 195	220	210	210	205	220	255	210	220	240
8	300	315	290	225	235	H 200	Es 425	260	225	225	210	200	200	I A 195	230	220	H 200	220	210	210	220	250	240	250
9	260	290	250	210	240	240	275	230	230	215	200	200	185	230	A	200	250	220	200	200	220	225	250	250
10	220	270	290	270	290	245	250	230	220	H 200	H 215	215	200	215	190	H 180	230	205	200	H 200	250	215	300	340
11	320	305	295	250	200	195	H 175	210	195	235	220	230	H 205	205	205	200	185	205	205	220	205	260	220	250
12	270	300	275	225	200	S 320	280	210	220	230	210	H 190	200	230	240	H 190	230	220	200	220	220	220	230	220
13	260	280	250	240	250	220	210	210	225	210	H 190	190	215	235	220	200	210	200	200	200	240	245	240	230
14	215	280	300	290	235	220	275	230	H 215	C	C	210	210	200	190	185	230	A	200	210	240	260	230	230
15	290	340	330	285	220	200	280	230	210	235	240	H 210	200	190	220	230	225	230	200	210	220	230	200	250
16	280	330	300	240	220	240	220	210	225	230	H 200	200	185	H 175	220	240	220	220	200	220	230	290	250	250
17	240	290	275	290	220	210	240	250	220	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	200	240	215	200	280	260
19	280	310	290	230	220	200	300	250	H 230	220	230	220	H 200	H 190	235	200	190	230	200	200	220	240	230	240
20	275	300	285	230	265	330	250	220	230	H 230	230	225	240	H 210	H 210	210	225	210	210	215	240	240	220	230
21	320	340	260	230	300	250	250	260	250	240	230	215	H 200	200	H 200	230	240	220	200	230	240	230	230	300
22	325	350	275	230	220	480	380	250	240	230	220	220	220	A	A	F 220	240	H 210	200	200	230	220	240	270
23	290	250	220	240	220	280	260	260	H 220	230	215	200	H 200	250	215	190	235	230	195	215	220	250	240	240
24	220	260	270	250	225	240	310	240	235	240	230	220	210	220	200	H 200	H 200	210	200	200	210	240	220	250
25	280	325	300	230	200	S	S	250	225	230	220	H 210	220	210	240	A	230	230	200	190	250	A	A	240
26	240	250	255	245	205	215	Es 320	270	235	240	230	230	225	240	225	200	H 185	220	200	185	210	205	225	Ea 300
27	275	300	270	240	220	210	190	275	240	245	250	220	220	H 200	A	H 185	235	225	200	215	250	225	215	210
28	Es 310	355	220	250	210	200	Es 390	240	230	220	235	220	200	185	H 185	230	240	210	200	225	215	205	230	200
29	245	280	230	250	200	220	250	220	205	220	230	H 190	190	215	H 200	210	200	240	200	190	225	225	245	250
30	270	310	310	270	280	200	Es 360	250	245	230	225	215	200	200	200	215	215	215	195	190	220	225	210	220
31	215	Es 280	240	275	250	225	Es 295	250	210	250	H 200	H 200	H 200	H 180	230	210	210	H 210	210	195	220	210	290	Es 285
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	28	29	29	29	28	28	29	29	27	26	28	28	28	30	30	30	29	29	30
MED	272	300	275	245	228	226	262	240	225	230	220	210	200	200	212	210	222	218	200	208	220	225	230	245
UQ	290	315	295	270	250	U 262	U 295	250	235	238	230	220	212	225	225	220	235	225	200	220	240	240	240	255
LQ	240	280	255	230	220	210	245	220	220	220	210	200	200	192	200	195	205	210	200	200	215	215	220	230

The Radio Research Laboratories, Japan

DEC. 1973 | H'F (KM)

IONOSPHERIC DATA

DEC. 1973 | H'ES (KM) | 135 E Mean Time (G. M. T.+ 9h)

Station OKINAWA Lat. 26 19.0 N. Long. 127 46.8 E Sweep 1 MHz to 25 MHz in 30 sec in automatio 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	G	110	150	140	115	115	105	105	105	105	G	S	S	B	S	100	115
2	S	S	S	S	120	105	110	100	G	115	120	G	G	G	160	100	100	100	100	S	S	100	S	S
3	100	S	S	S	B	S	110	110	110	105	105	105	G	G	G	105	U G 180	100	100	S	S	S	S	S
4	S	S	130	120	120	100	115	S	110	110	110	105	105	100	105	100	100	95	100	105	100	100	100	S
5	130	130	125	S	100	S	S	S	110	110	115	115	115	110	110	110	110	G	B	S	S	S	S	S
6	S	110	110	110	110	110	110	110	105	160	U G 175	100	U G 170	105	G	105	G	U G 175	S	S	S	S	S	S
7	S	S	S	S	S	S	S	C	C	160	140	110	115	110	105	100	100	105	100	100	100	S	S	S
8	S	S	S	S	100	100	100	S	145	G	120	120	125	110	120	110	110	100	100	100	100	100	100	100
9	100	100	S	S	S	150	S	S	120	120	120	110	110	110	110	175	100	G	B	S	S	S	S	S
10	S	S	S	S	B	100	100	100	G	120	120	110	110	105	100	100	100	140	100	S	100	S	S	S
11	S	S	S	S	B	S	S	S	115	105	115	110	150	105	105	105	105	100	100	100	100	100	100	100
12	S	S	S	110	110	105	B	B	G	110	120	110	110	100	100	100	100	G	100	100	100	100	100	S
13	S	S	S	S	S	S	S	S	G	G	115	120	120	115	110	110	100	100	100	100	100	S	S	S
14	S	S	S	S	B	B	S	B	125	C	C	120	120	110	110	100	100	100	100	100	100	100	100	100
15	100	S	S	S	S	B	S	S	105	170	100	150	110	110	100	100	100	100	100	100	100	100	S	S
16	S	S	S	S	S	S	S	S	G	120	120	120	115	115	110	100	110	160	100	105	120	B	S	S
17	B	S	S	S	S	S	S	S	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	B	S	100	S
19	S	S	S	S	S	S	B	S	130	G	110	110	110	110	110	100	100	160	100	S	S	S	S	100
20	S	S	S	S	S	B	S	105	G	110	115	170	140	150	110	100	160	135	100	100	120	100	115	S
21	S	S	S	S	S	S	S	S	G	G	160	160	G	G	110	100	140	120	100	120	115	S	S	115
22	110	110	B	S	B	S	100	100	G	115	110	120	115	110	110	100	200	100	100	120	100	100	S	S
23	S	S	B	S	S	S	S	110	100	115	115	G	G	150	135	110	100	105	100	100	100	100	S	S
24	S	S	S	B	S	B	S	S	G	G	160	110	135	120	120	110	100	100	S	S	S	S	100	S
25	S	110	110	S	S	S	S	S	G	165	G	140	120	115	110	100	100	100	100	100	150	115	120	110
26	100	100	100	S	S	B	S	S	G	G	170	165	130	115	110	110	110	100	100	S	S	B	S	100
27	S	S	S	S	B	105	S	S	G	115	115	160	125	120	115	G	160	150	140	145	110	S	B	S
28	S	S	S	S	S	B	S	S	G	G	150	130	120	110	115	105	105	110	100	120	100	S	B	S
29	S	S	S	S	S	S	S	G	G	G	U G 170	120	G	G	100	100	100	100	B	B	S	S	S	S
30	S	B	S	S	S	B	S	S	G	150	140	120	120	115	105	100	120	105	S	S	S	B	S	100
31	S	S	S	S	110	S	S	S	110	105	135	120	120	120	150	135	120	125	S	S	S	S	S	S
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	6	6	5	3	7	8	7	7	13	20	27	27	24	25	27	28	28	25	21	16	17	11	10	9
MED	100	110	110	110	110	105	110	105	110	115	120	120	120	110	110	100	102	100	100	100	100	100	100	100
UQ	110	110	125	115	115	108	110	110	120	150	140	125	125	115	112	110	115	125	100	112	110	100	100	110
LQ	100	100	110	110	105	100	100	100	110	110	115	110	112	110	105	100	100	100	100	100	100	100	100	100

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DEC. 1973 | H'ES (KM)

IONOSPHERIC DATA

DEC. 1973 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station OKINAWA Lat. 26° 19.0' N. Long. 127° 46.8' E Sweep 1 MHz to 25 MHz in 30 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									C 1	H 1	H 1	C 1	C 1	C 2	C 2	L 1	L 1						F 1	F 2
2					F 1	F 1	F 1	L 2		C 2	C 1				H 2	L 1	L 2	L 1	L 1			F 2		
3	F 1						F 1	L 1	C 2	C 2	C 2	L 1				L 1	HL 12	L 2	F 1					
4			F 1	F 1	F 1	F 2	F 1		C 4	C 3	C 2	L 2	C 3	L 3	L 3	L 3	L 7	L 4	F 6	F 1	F 3	F 1	F 1	
5	F 1	F 1	F 1		F 2				C 3	C 2	C 2	C 1	C 2	C 3	C 2	C 2	C 2							
6		F 3	F 2	F 4	F 4	F 4	F 3	L 1	L 1	HL 12	HL 11	L 3	HL 12	LH 11		C 1		H 2						
7										H 1	H 2	C 1	C 1	C 2	C 2	C 2	L 2	L 1	L 4	F 2	F 1			
8					F 3	F 2	F 2		H 1		C 1	C 1	C 1	C 2	C 1	C 2	C 3	LH 12	F 3	F 3	F 1	F 1	F 3	F 2
9	F 2	F 2				F 1			C 1	C 2	C 2	C 3	C 2	C 2	L 3	HL 12	LH 11							
10						F 2	F 1	L 2		C 2	C 1	C 2	C 2	L 2	L 2	L 2	L 3	LL 12	L 1		F 1			
11									C 2	C 2	C 2	C 2	H 1	C 2	L 2	C 2	L 2	L 3	L 3	F 4	F 4	F 1	F 2	F 1
12				F 2	F 1	F 1				C 2	C 2	C 1	L 1	L 2	L 2	L 3	L 2		F 3	F 1	F 1	F 1	F 1	
13											L 1	C 1	C 1	C 2	L 2	L 2	L 1	L 3	F 3	F 2	F 2			
14									C 1			C 1	C 1	C 2	C 1	C 2	L 4	L 6	L 3	F 3	F 2	F 1	F 1	F 2
15	F 1								L 1	HL 12	LH 22	HL 11	L 2	L 2	L 3	L 2	L 1	L 1	F 1	F 1	F 1	F 1		
16										C 1	C 1	C 1	L 1	L 2	LH 21	L 2	L 2	H 1	F 3	F 1	F 2			
17																								
18																							F 1	
19									L 1		L 1	L 1	L 1	L 2	L 1	LH 21	L 2	HL 11	F 1					F 1
20								L 1		L 2	L 2	HL 11	CL 11	HL 11	C 1	L 2	HL 11	C 1	F 2	F 3	F 1	F 1	F 1	
21											HC 11	H 1			L 1	LH 21	CL 11	C 1	F 1	F 1	F 2			F 2
22	F 2	F 2					F 1	L 1		L 1	L 1	C 1	C 1	C 3	C 4	L 2	HL 22	L 3	F 2	F 2	F 1	F 1		
23								L 1	L 1	L 1	C 1			HC 11	CL 21	L 2	L 1	L 1	F 2	F 3	F 2	F 2		
24											HC 12	CH 11	HC 12	CL 11	CL 11	L 1	L 1	L 1					F 1	
25		F 1	F 1							HH 11		H 1	C 1	C 2	C 2	L 3	L 3	L 3	F 2	F 1	F 3	F 4	F 1	F 4
26	F 2	F 1	F 1								H 1	HC 11	CC 11	C 2	C 3	C 2	L 1	L 1	F 1					F 2
27						F 1				C 2	C 2	HC 11	C 1	C 1	C 2		HL 11	HL 11	LL 22	F 3	F 1			
28											H 1	CC 21	C 1	C 2	C 1	L 2	L 3	LL 11	F 3	FF 23	F 1			
29											H 1	C 1			L 2	L 2	L 3	L 1						
30										H 1	H 1	C 1	C 1	C 2	C 2	C 2	C 1	L 1						F 5
31					F 1				L 1	L 1	H 2	C 1	C 1	C 1	HHL 11	H 1	CL 21	LL 11						
	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																								

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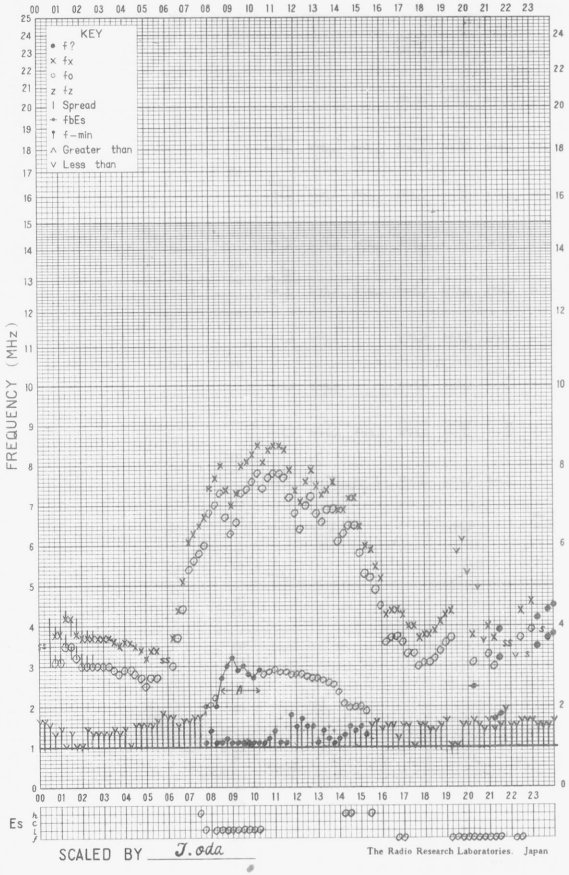
DEC. 1973 | TYPES OF ES

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC. 1, 1973



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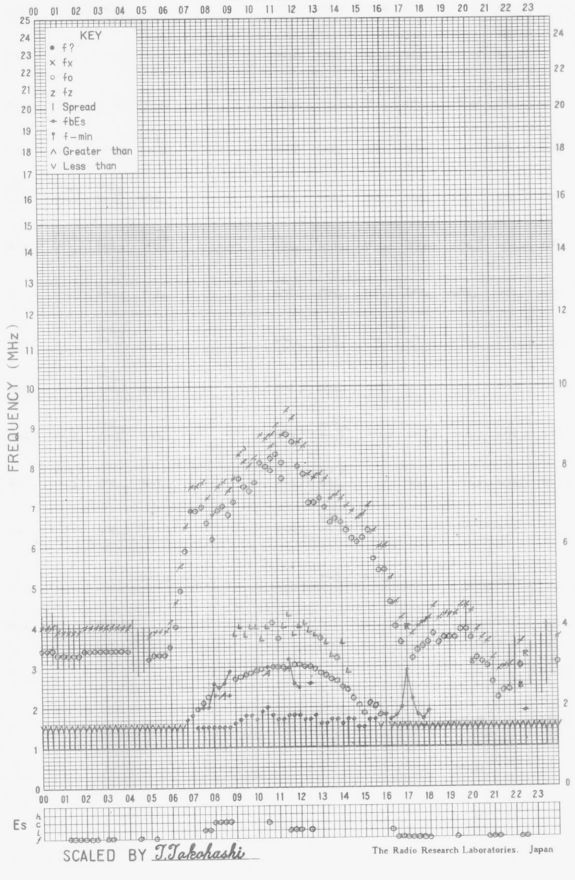
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Dec. 1, 1973



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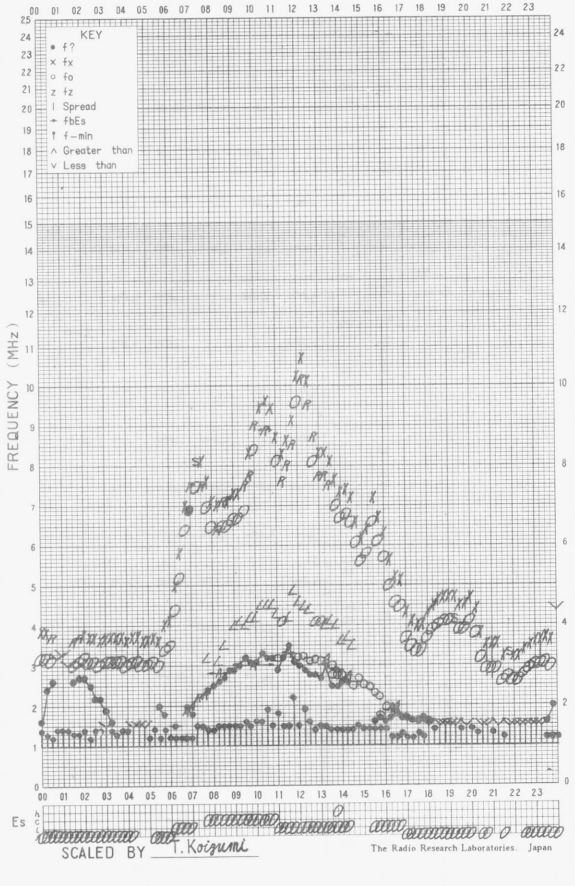
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE DEC. 1, 1973



SCALED BY T. Koizumi

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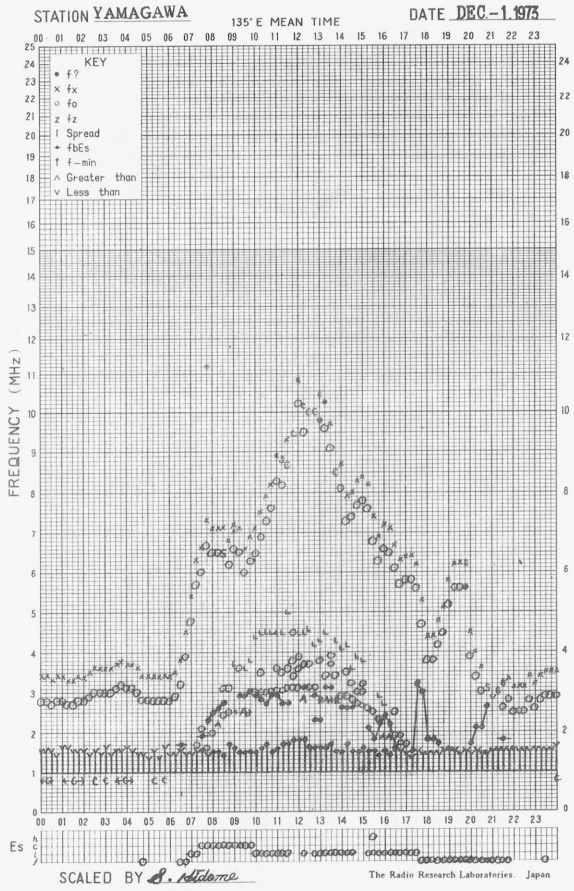
f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE DEC.-1.1973



SCALED BY S. Ishidome

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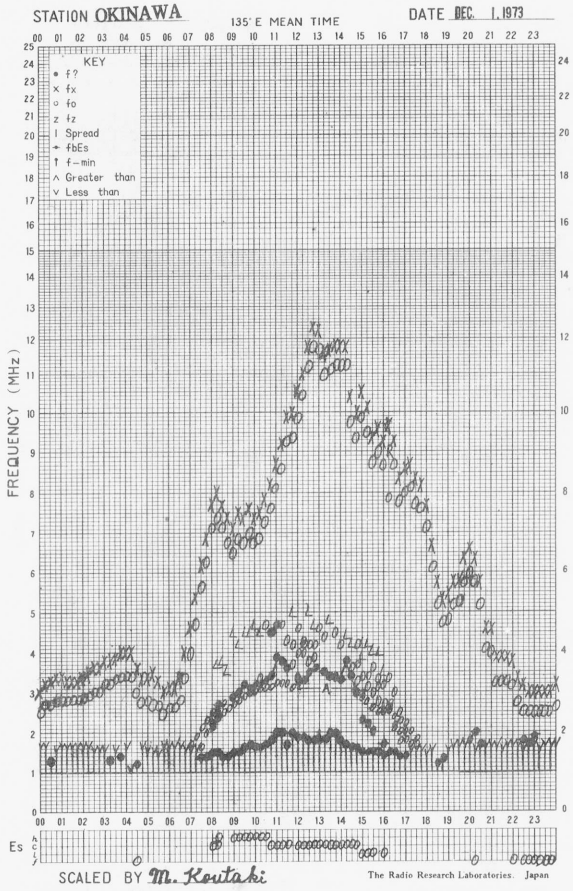
f-PLOT OF IONOSPHERIC DATA

STATION OKINAWA 135°E MEAN TIME DATE DEC. 1, 1973



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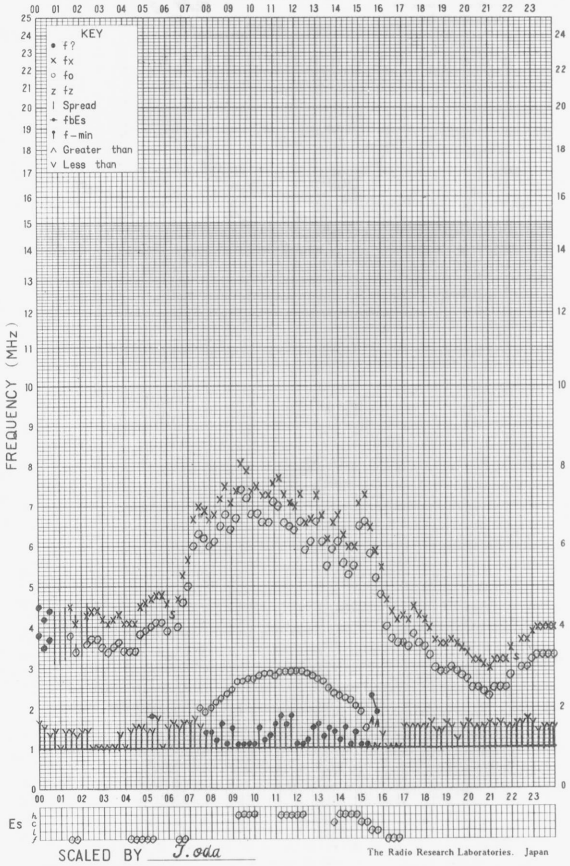
f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC. 2. 1973



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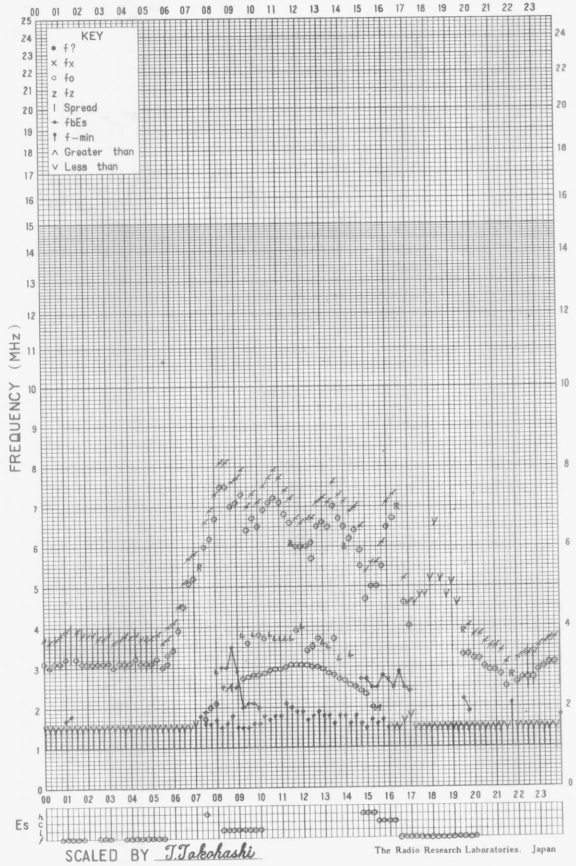
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Dec. 2. 1973



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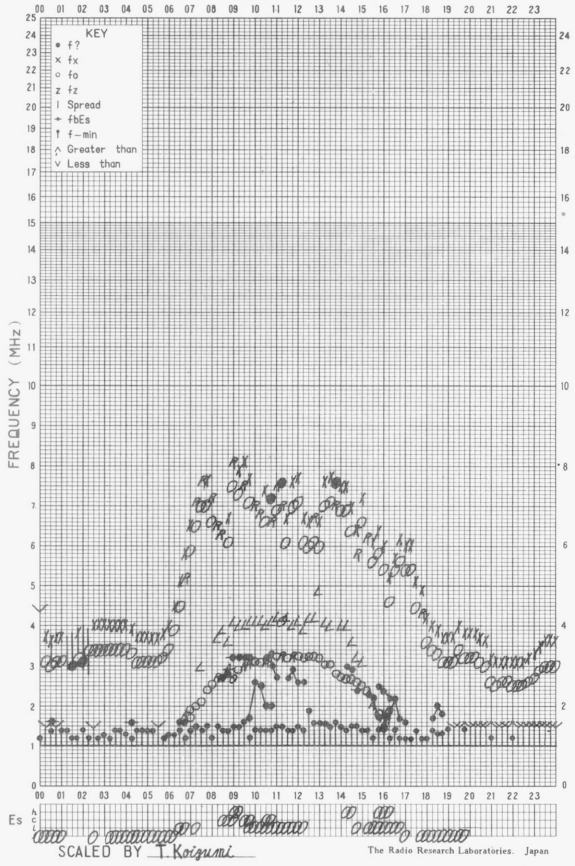
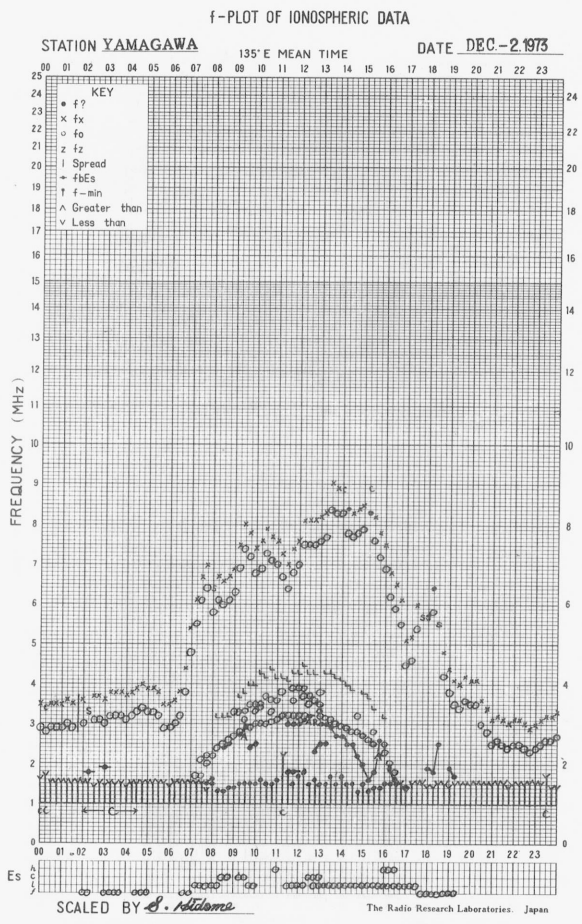
f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE DEC. 2. 1973



SCALED BY T. Koizumi

The Radio Research Laboratories. Japan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STATION YAMAGAWA
135° E MEAN TIME
DATE DEC.-2.1973
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FREQUENCY (MHz)
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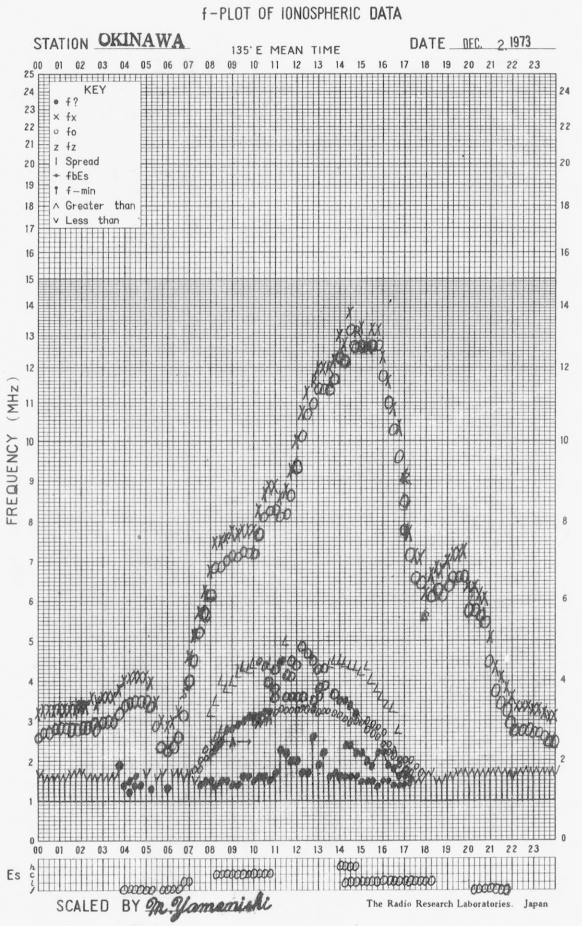
SCALED BY S. Ishizuka
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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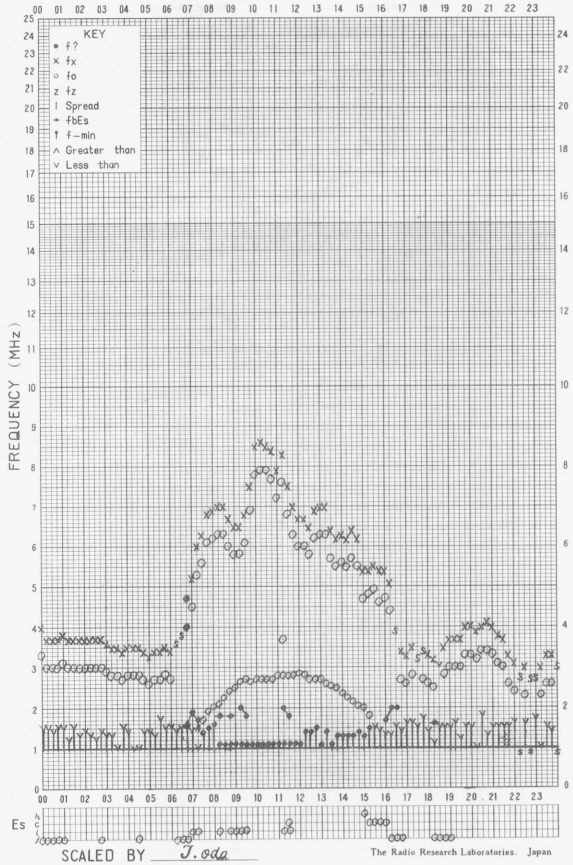
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE DEC. 3. 1973



SCALED BY J. oda

The Radio Research Laboratories. Japan

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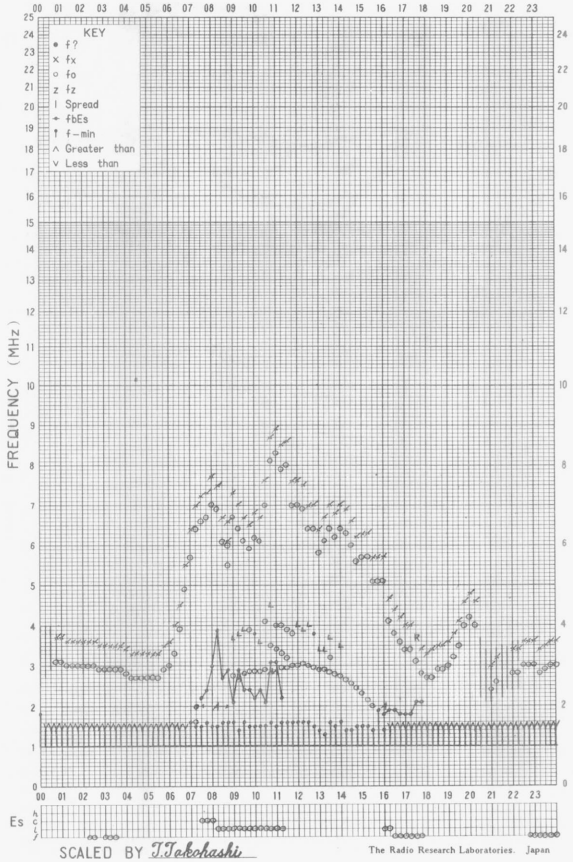

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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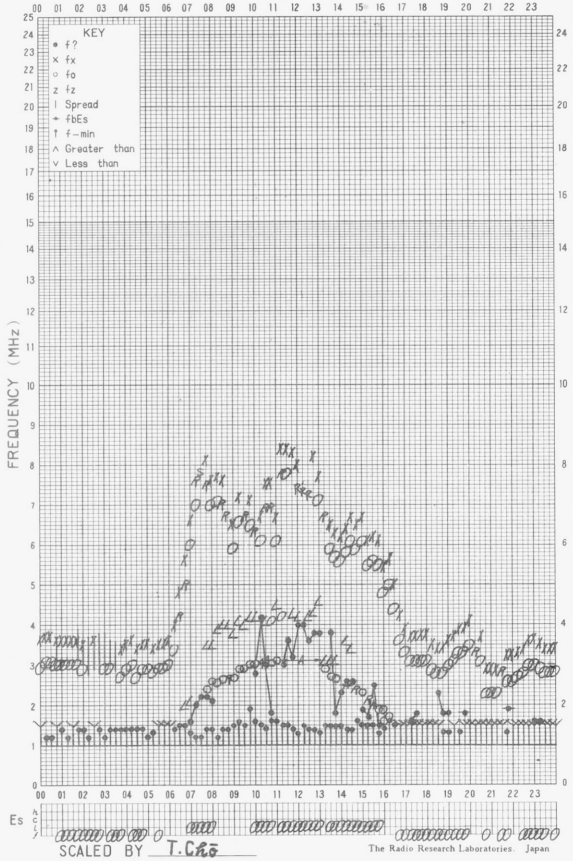
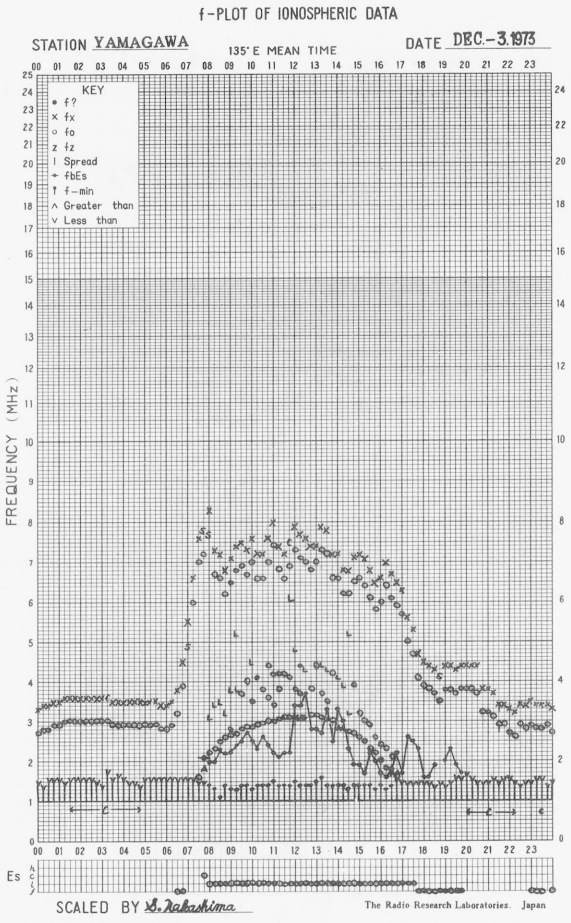


SCALED BY T. Ichō

The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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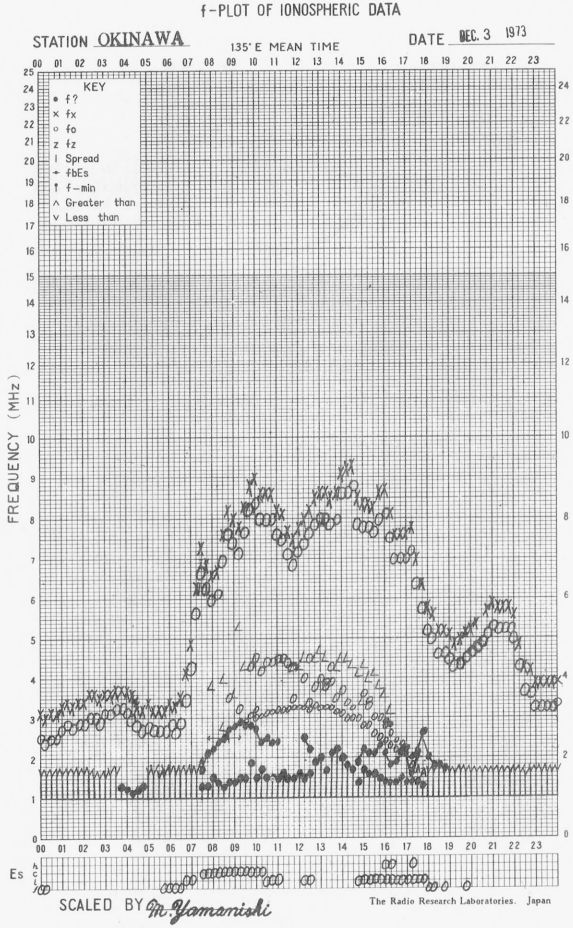
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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SCALED BY M. Yamanishi
The Radio Research Laboratories. Japan

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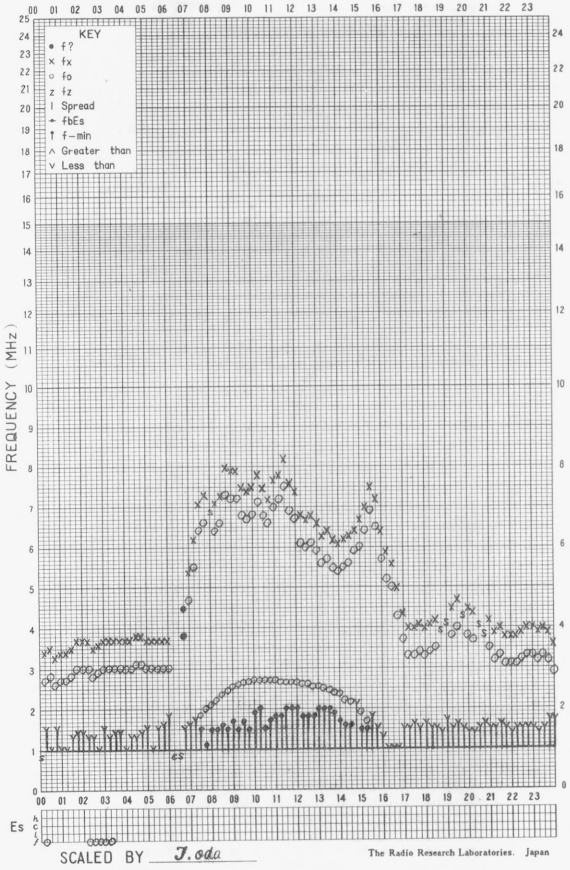
STATION WAKKANAI 135°E MEAN TIME DATE DEC. 4. 1973



SCALED BY T. oda

The Radio Research Laboratories. Japan

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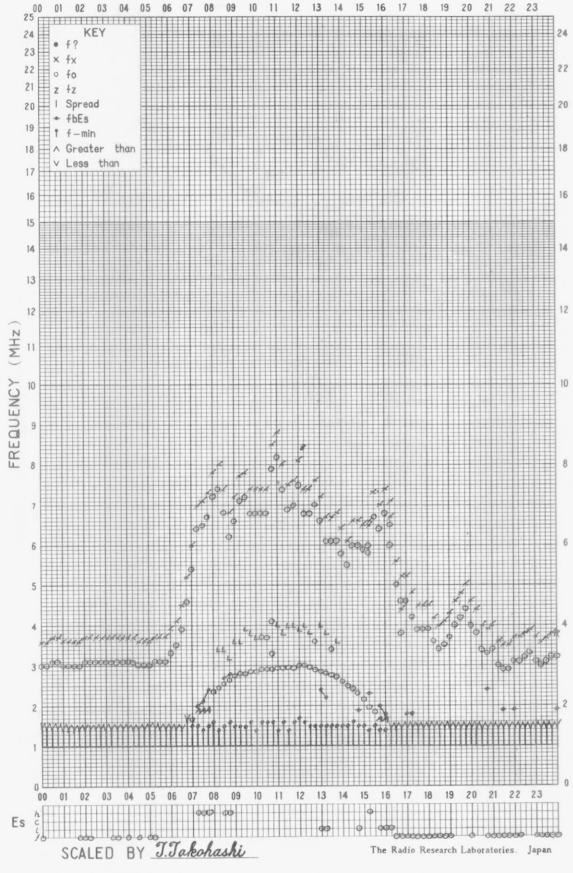

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The Radio Research Laboratories. Japan

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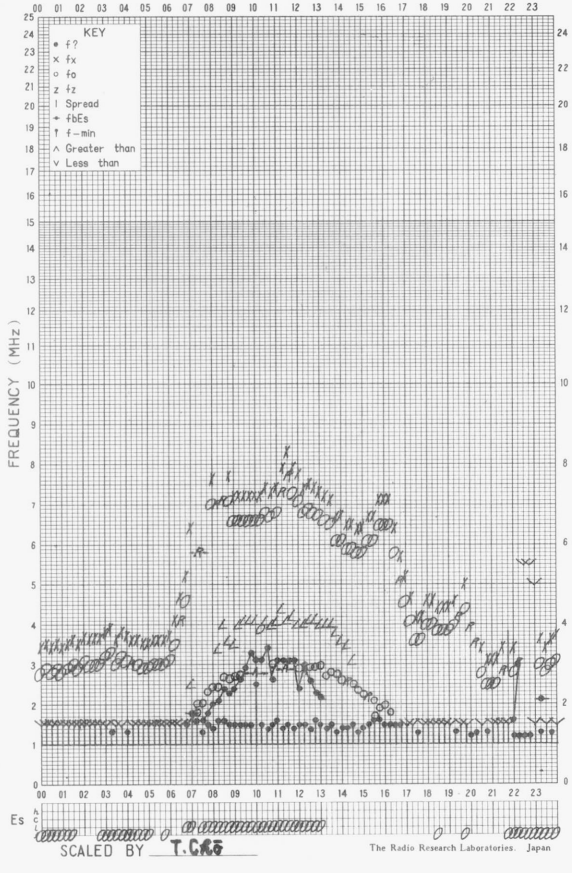

SCALED BY T. C&S

The Radio Research Laboratories. Japan

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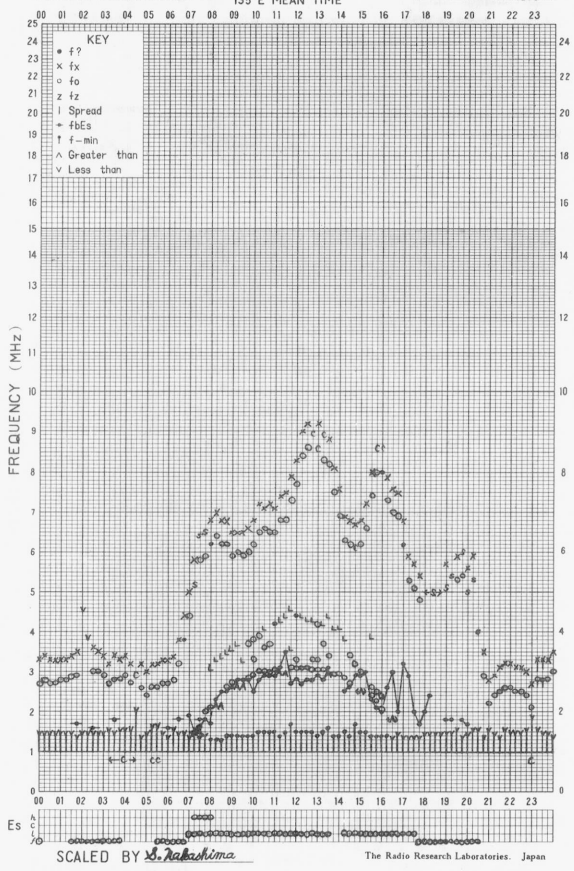

SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

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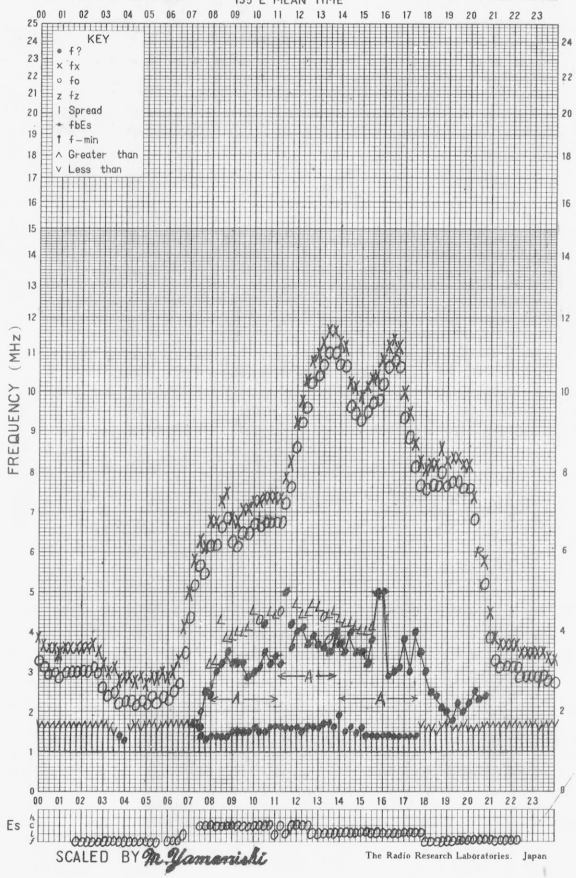

SCALED BY M. Yamanishi

The Radio Research Laboratories. Japan

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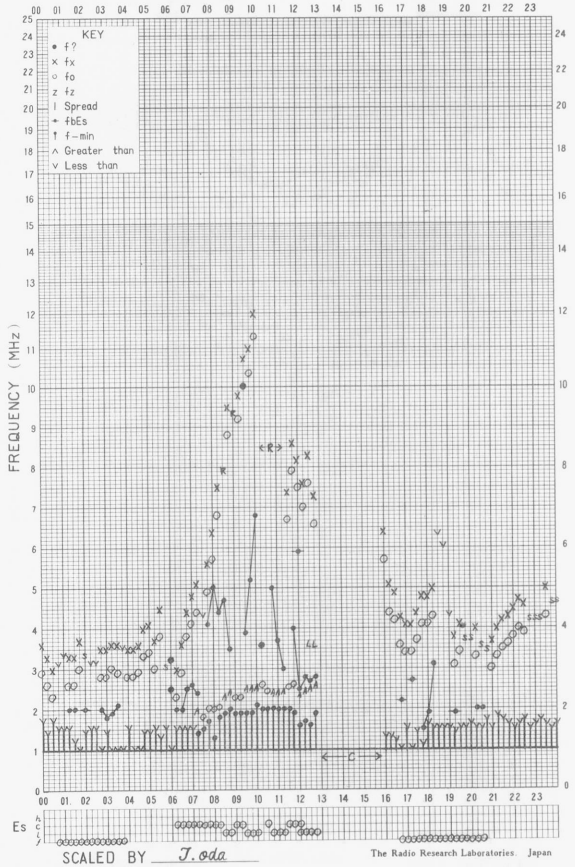

SCALED BY J. oda

The Radio Research Laboratories. Japan

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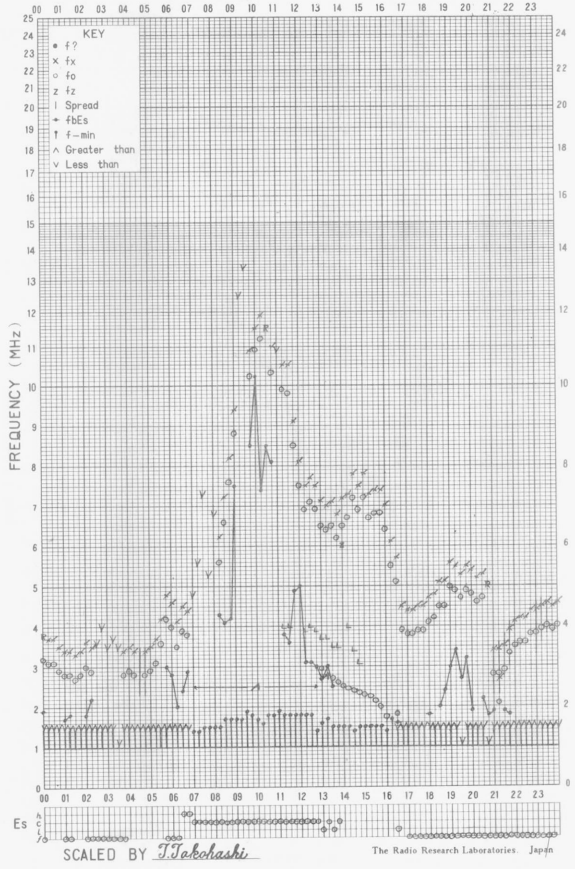

SCALED BY T Takahashi

The Radio Research Laboratories. Japan

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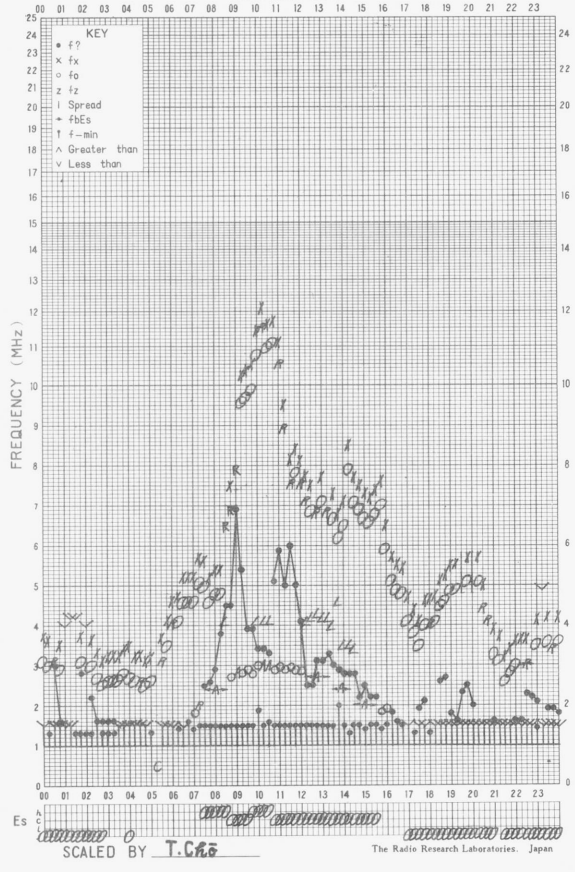

SCALED BY T. Ono

The Radio Research Laboratories. Japan

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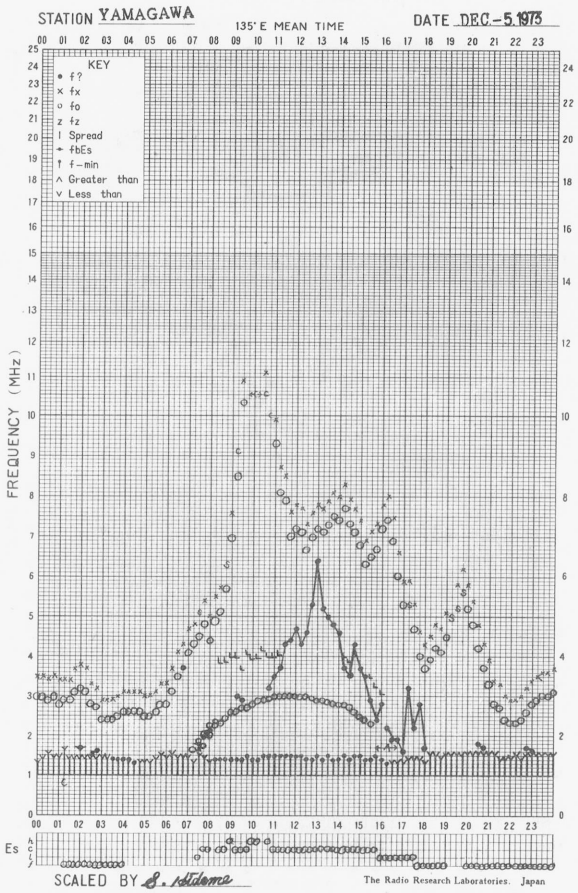

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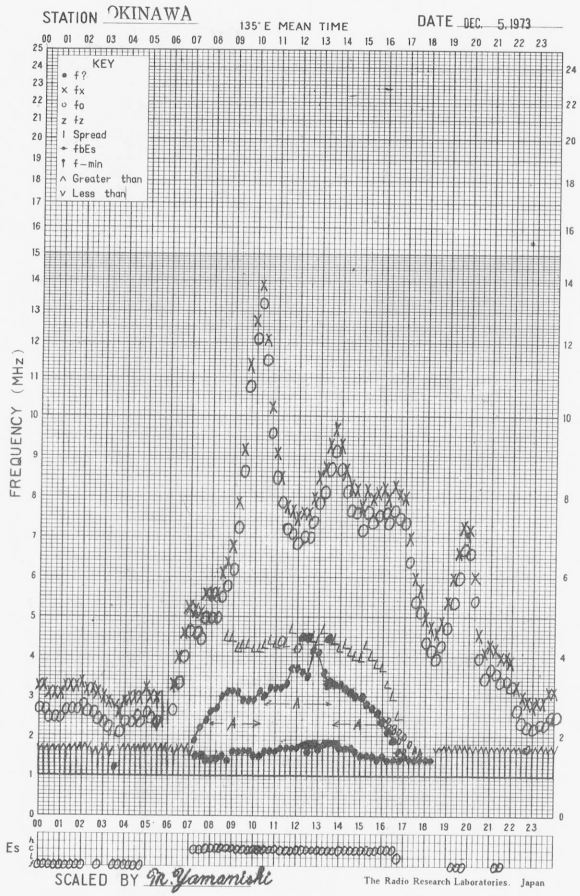

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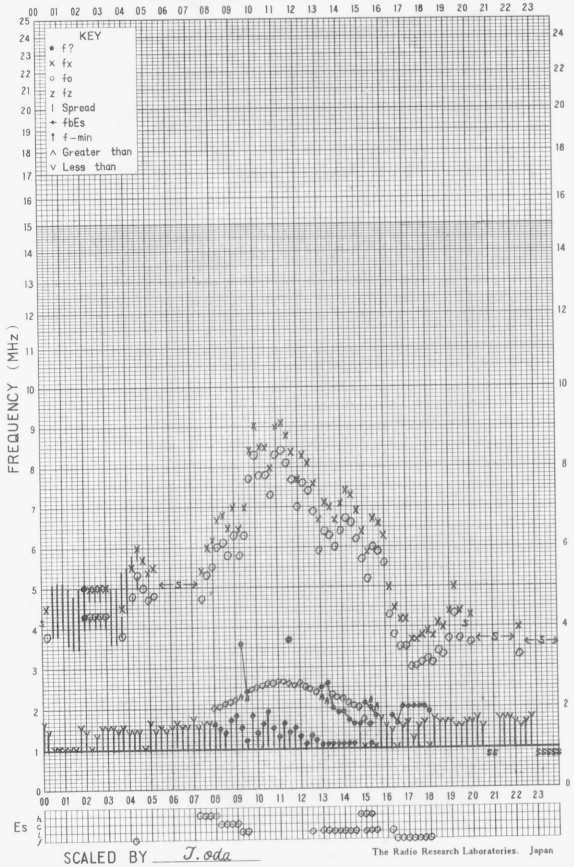

SCALED BY T. oda

The Radio Research Laboratories. Japan

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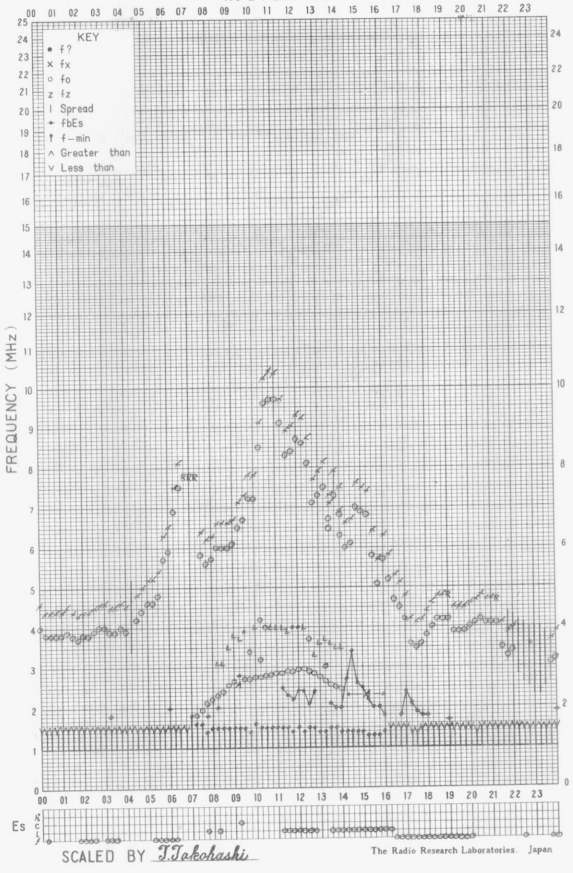

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The Radio Research Laboratories. Japan

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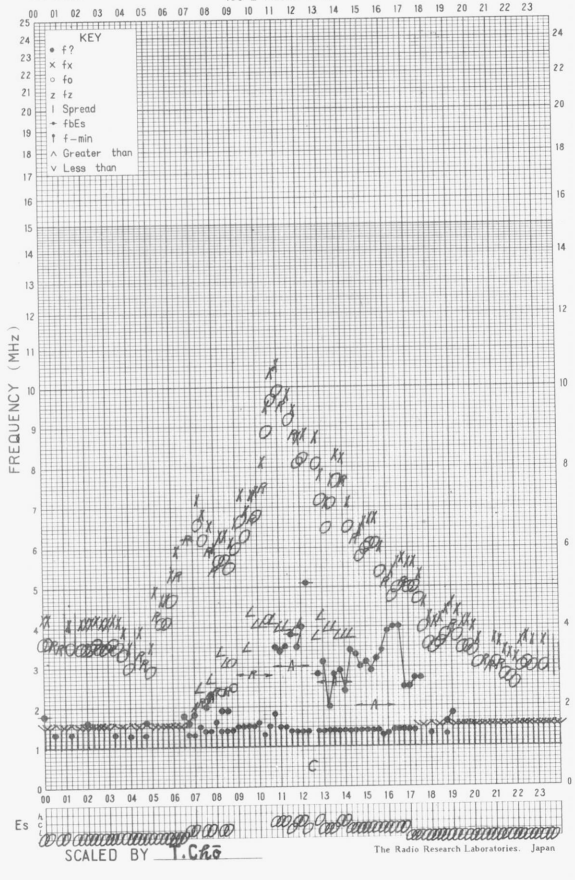
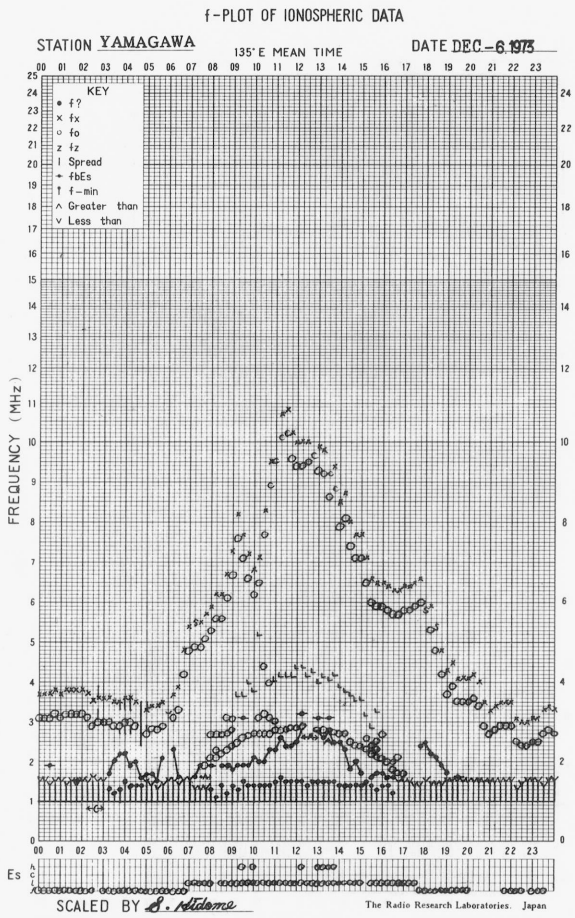


SCALED BY T. Cho

The Radio Research Laboratories. Japan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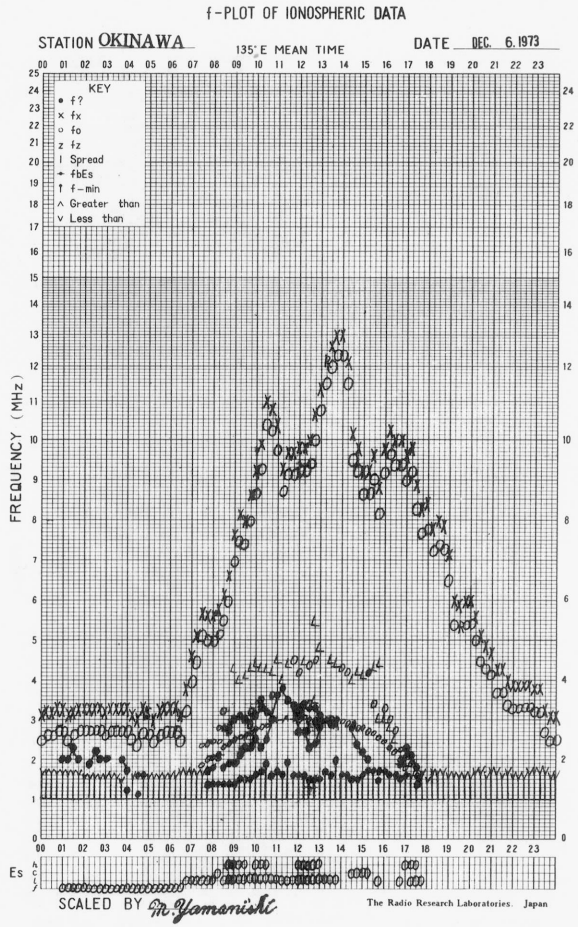
SCALED BY S. Ishidome
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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SCALED BY M. Yamanishi
The Radio Research Laboratories. Japan

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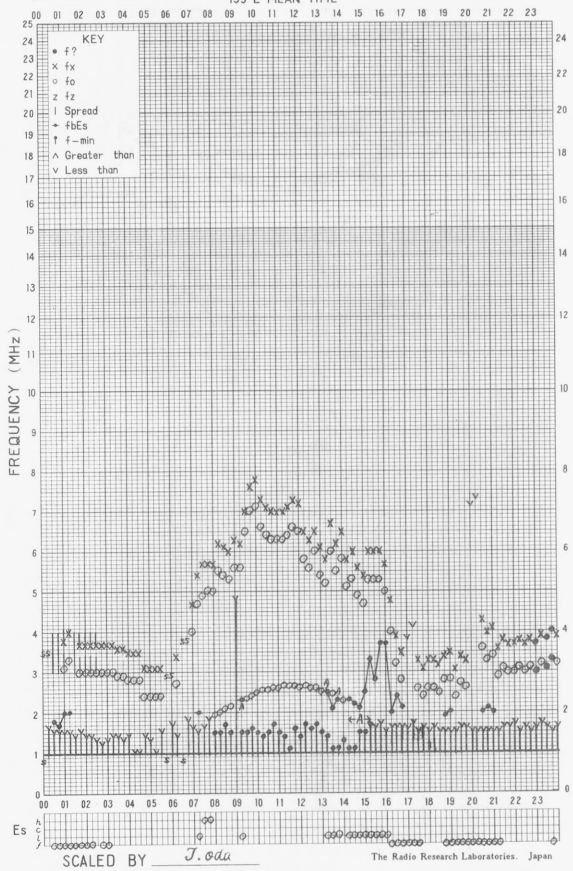

SCALED BY J. oda

The Radio Research Laboratories. Japan

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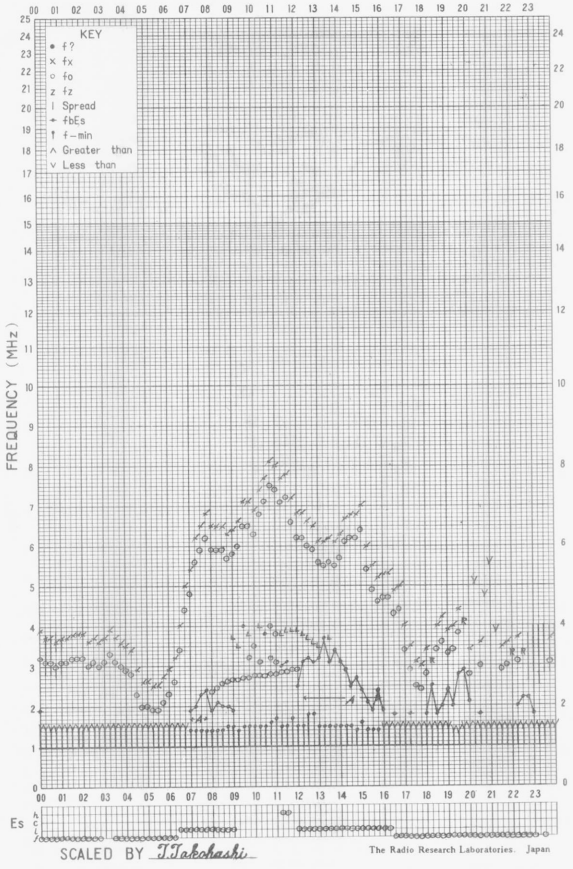

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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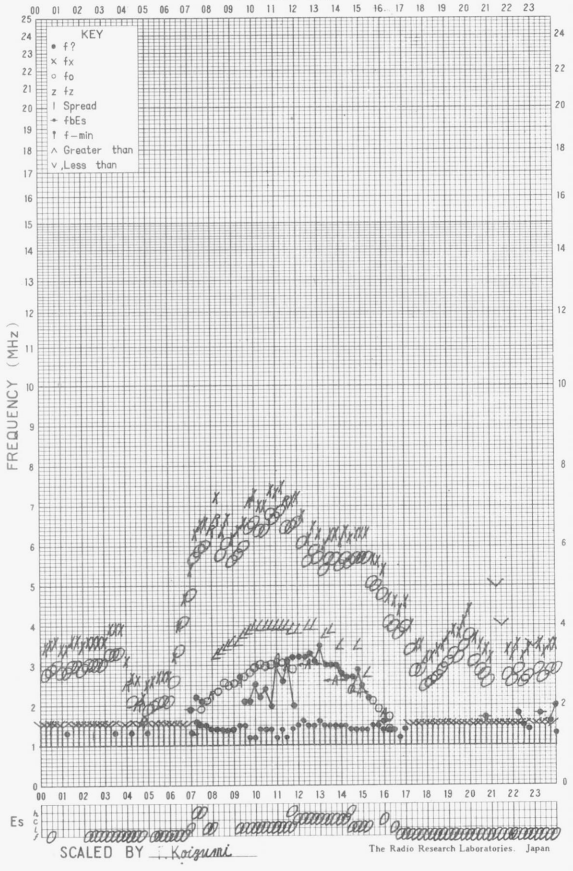

SCALED BY K. Koizumi

The Radio Research Laboratories. Japan

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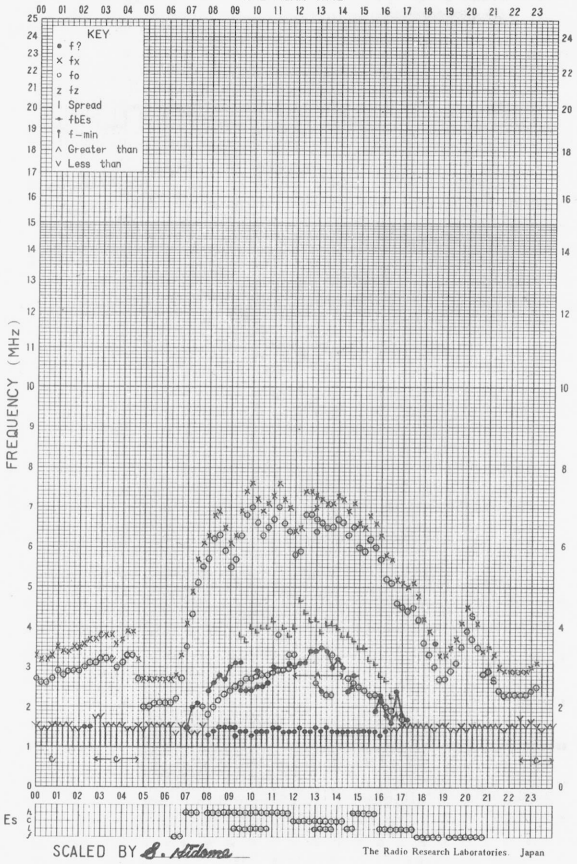

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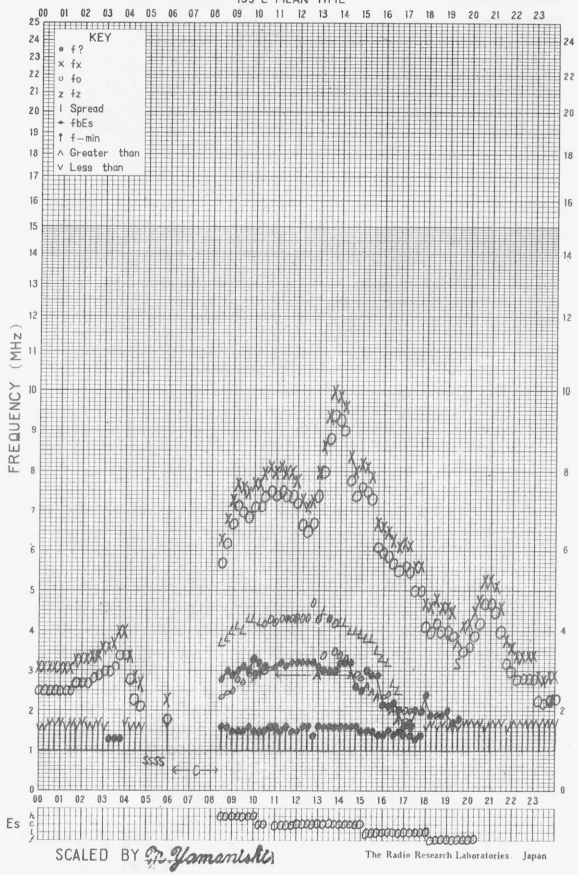

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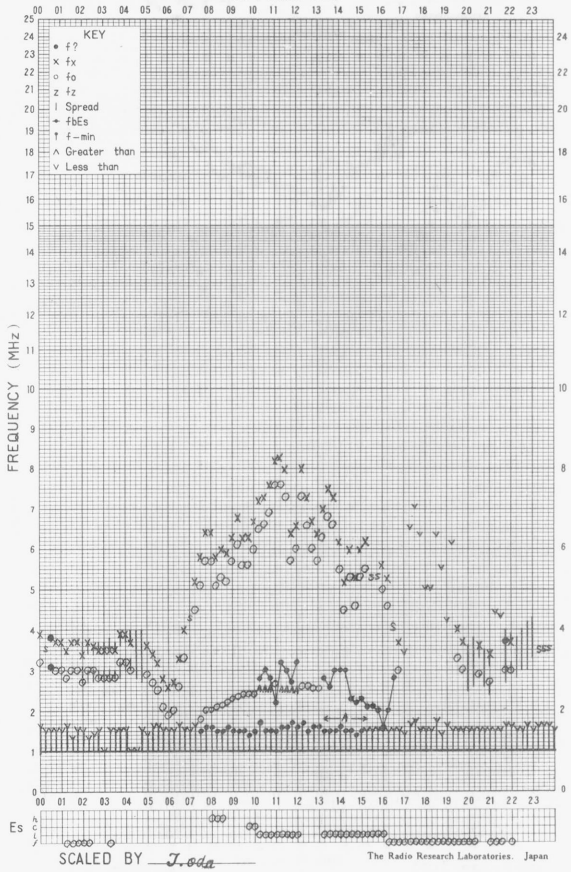

SCALED BY T. oda

The Radio Research Laboratories. Japan

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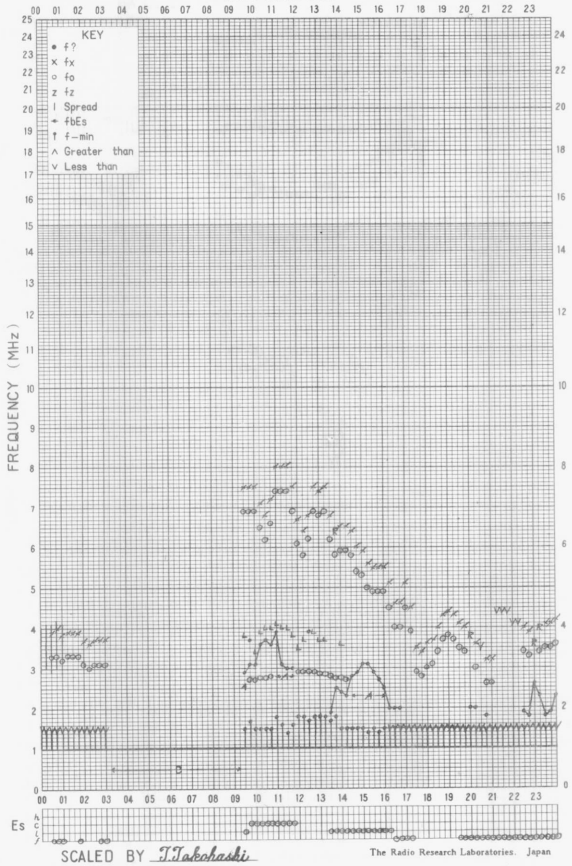

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The Radio Research Laboratories. Japan

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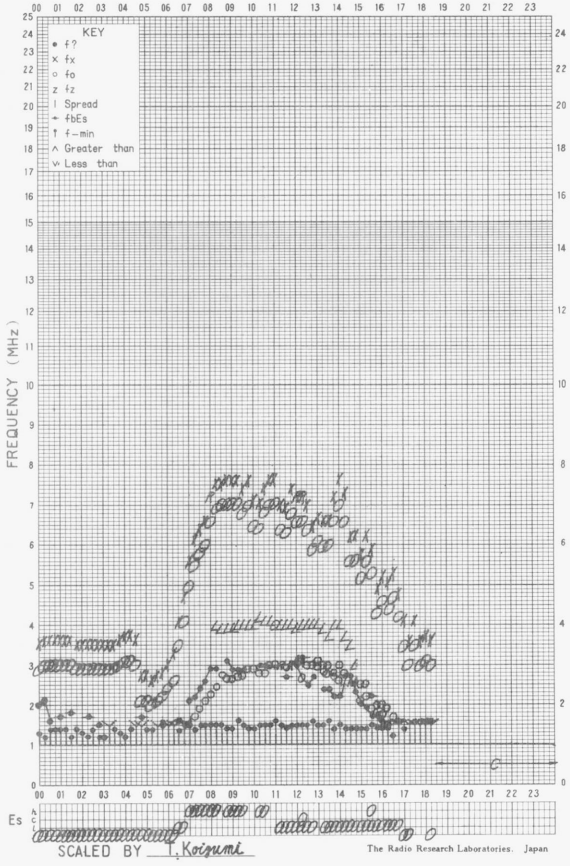
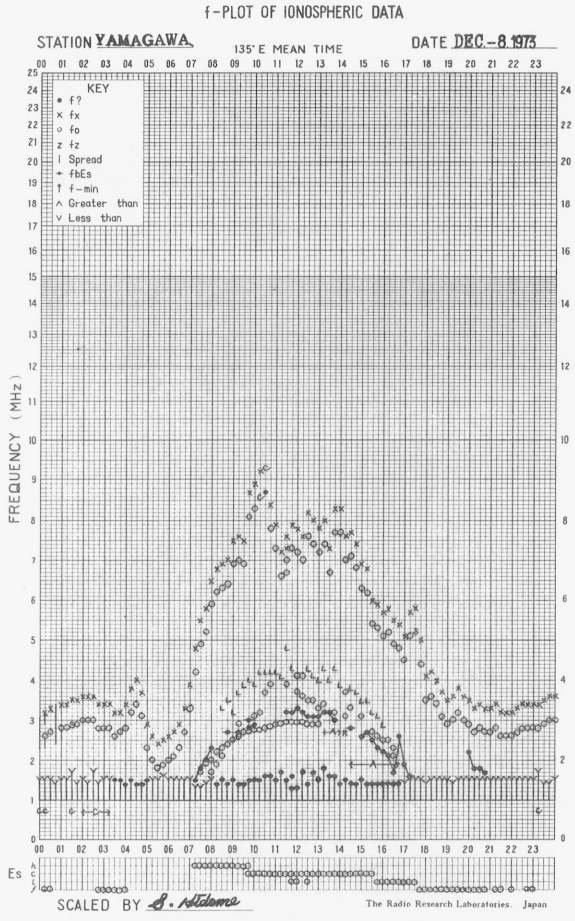


SCALED BY I. Koizumi

The Radio Research Laboratories. Japan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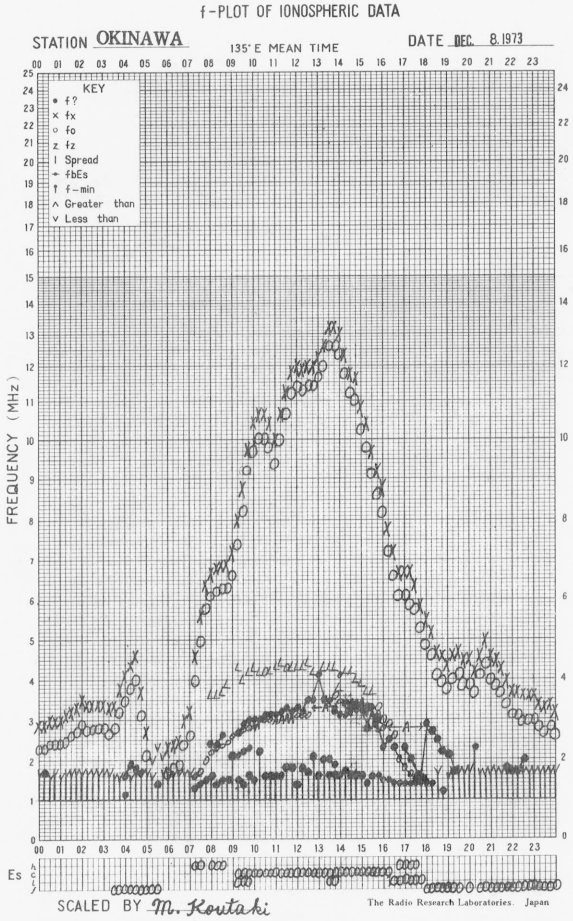
SCALED BY S. Ishizawa
The Radio Research Laboratories. Japan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SCALED BY M. Kouzaki
The Radio Research Laboratories. Japan

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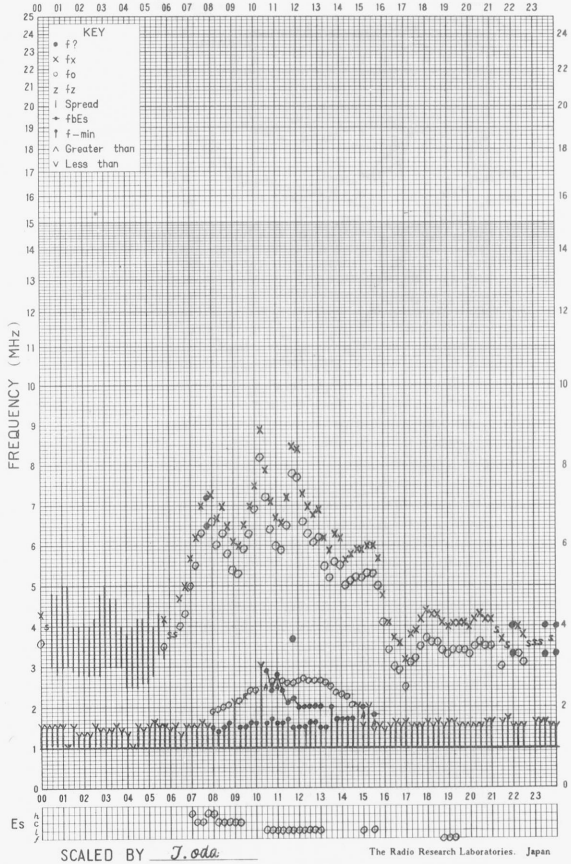

SCALED BY T. oda

The Radio Research Laboratories. Japan

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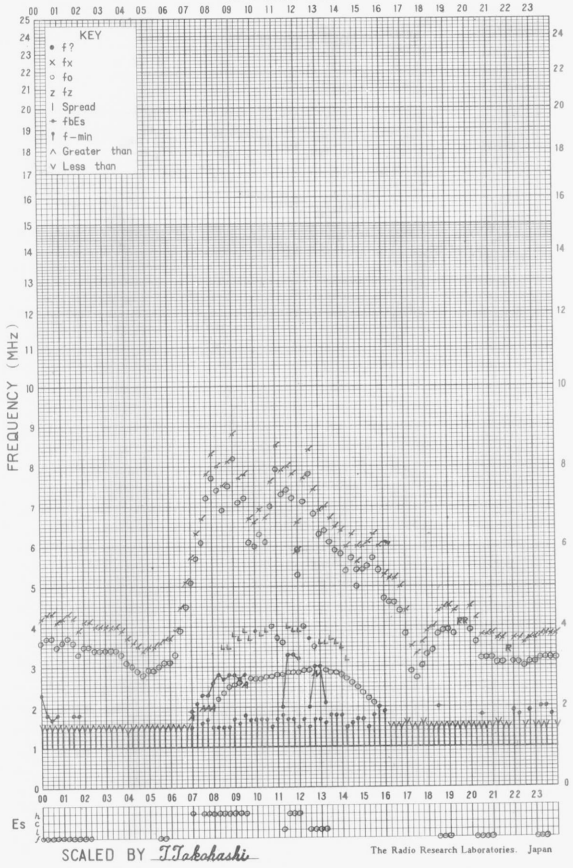

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The Radio Research Laboratories. Japan

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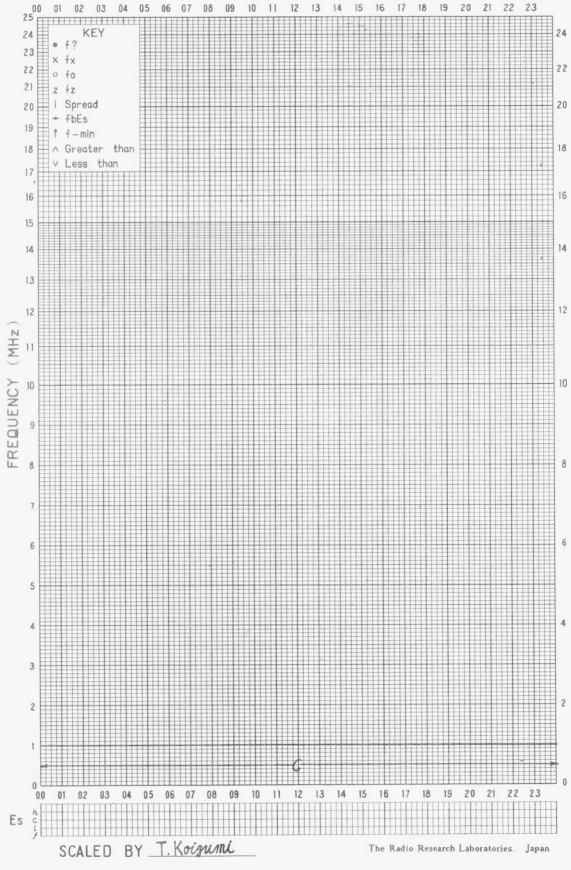
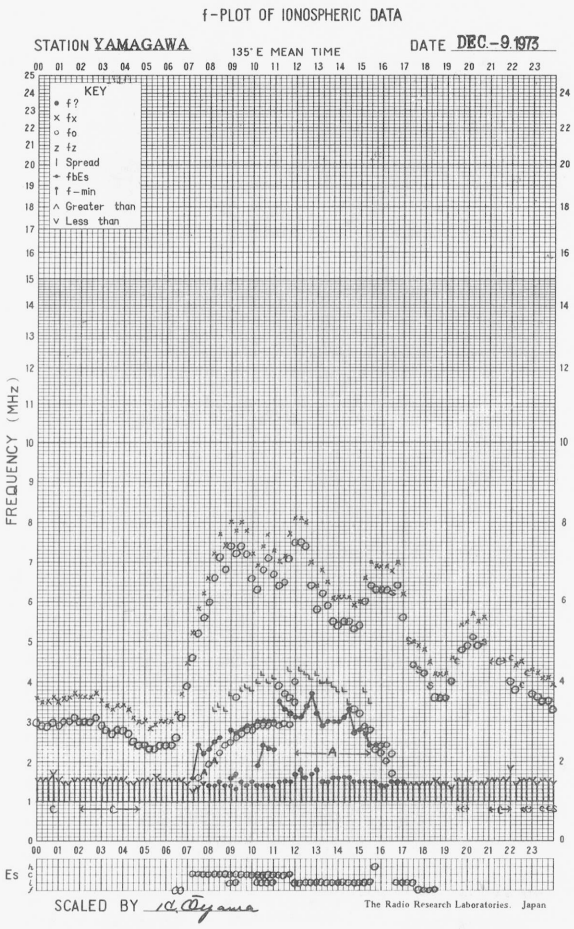


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan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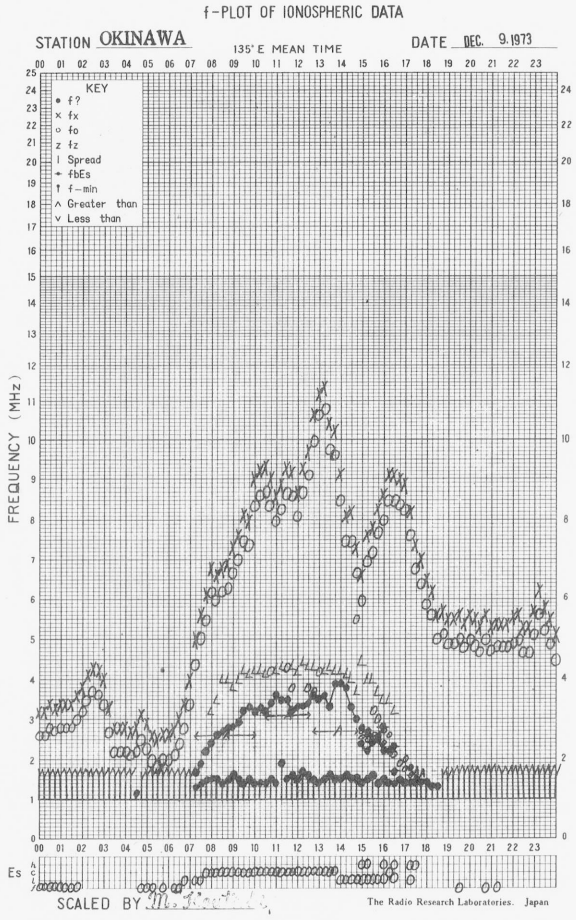
SCALED BY
The Radio Research Laboratories. Japan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The Radio Research Laboratories. Japan

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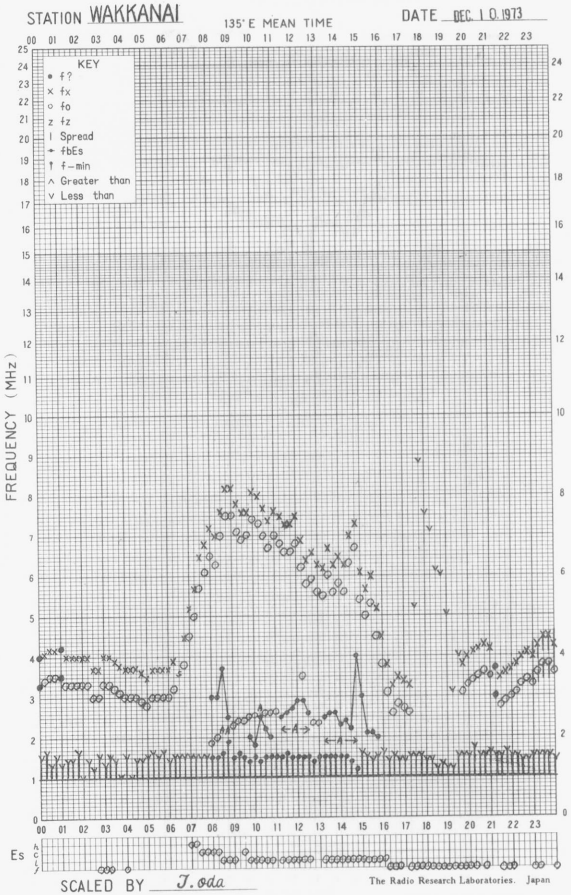

SCALED BY J. Oda

The Radio Research Laboratories. Japan

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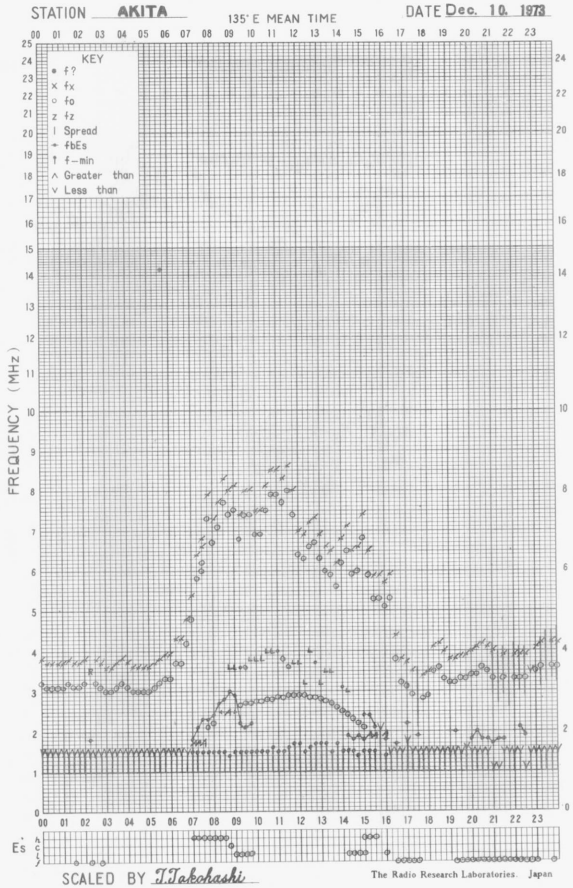

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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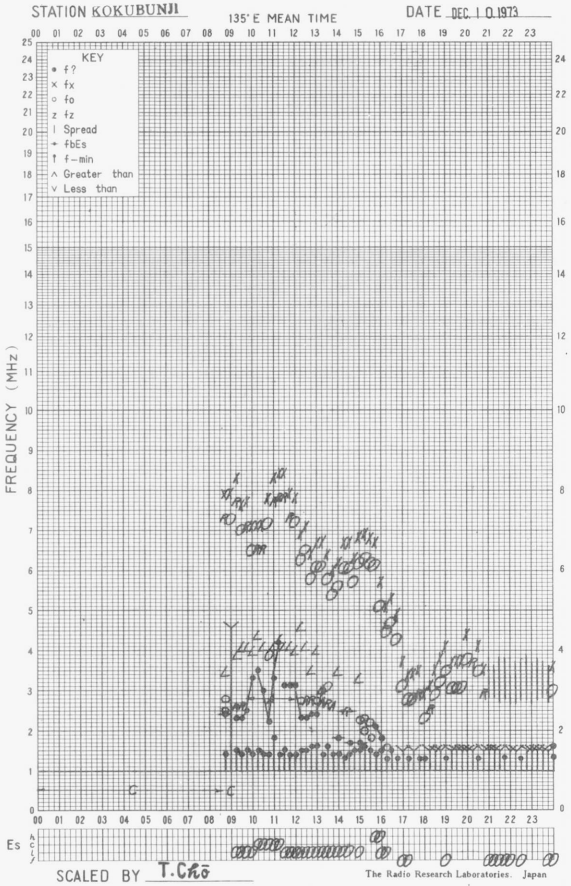

SCALED BY T. Chō

The Radio Research Laboratories. Japan

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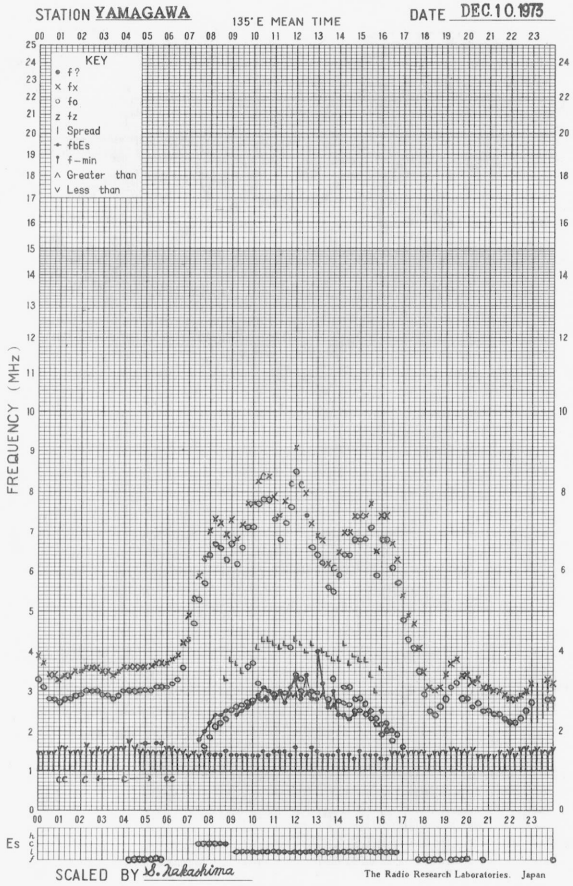
STATION YAMAGAWA 135° E MEAN TIME DATE DEC. 10. 1973



SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

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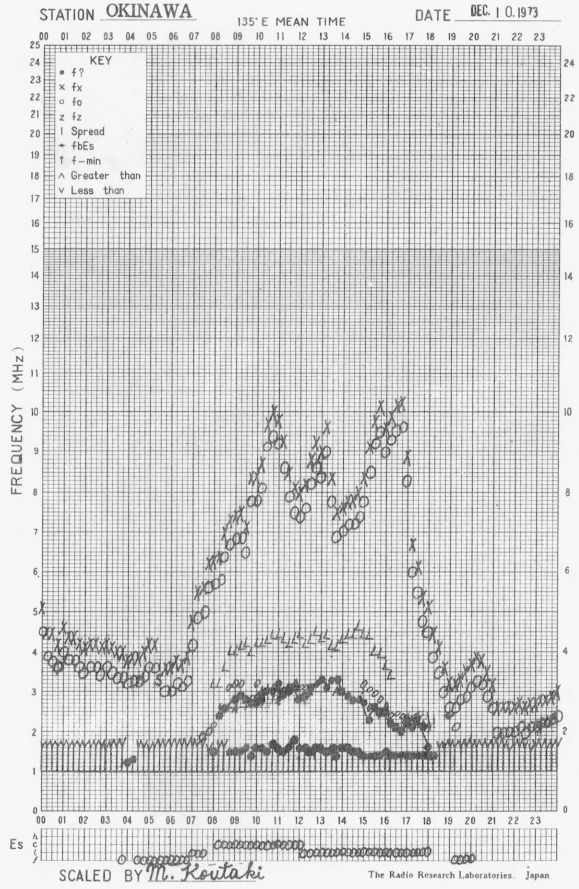
STATION OKINAWA 135° E MEAN TIME DATE DEC. 10. 1973



SCALED BY M. Kowtaki

The Radio Research Laboratories. Japan

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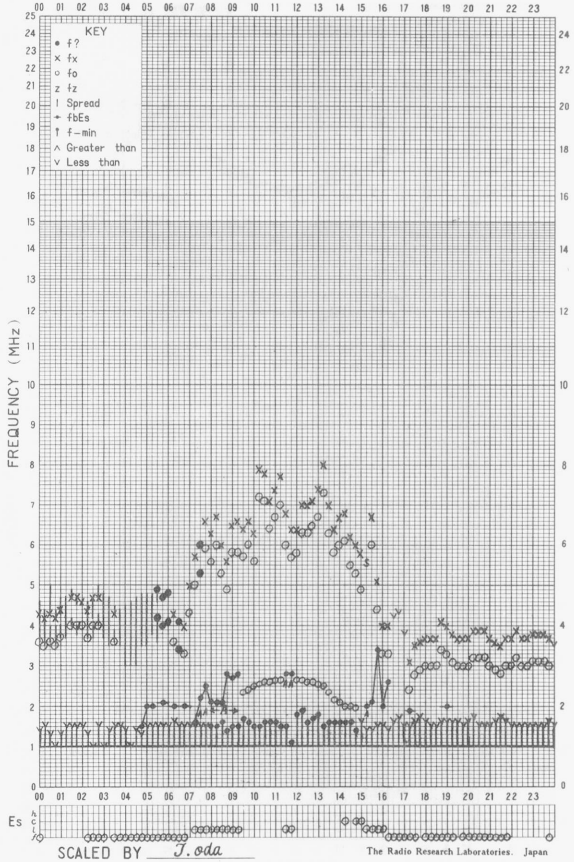
STATION WAKKANAI 135°E MEAN TIME DATE DEC. 11. 1973



SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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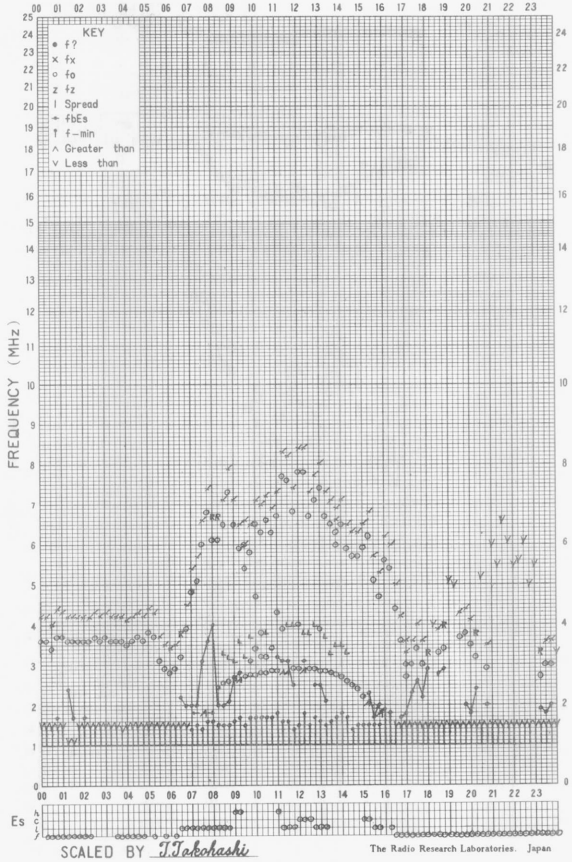

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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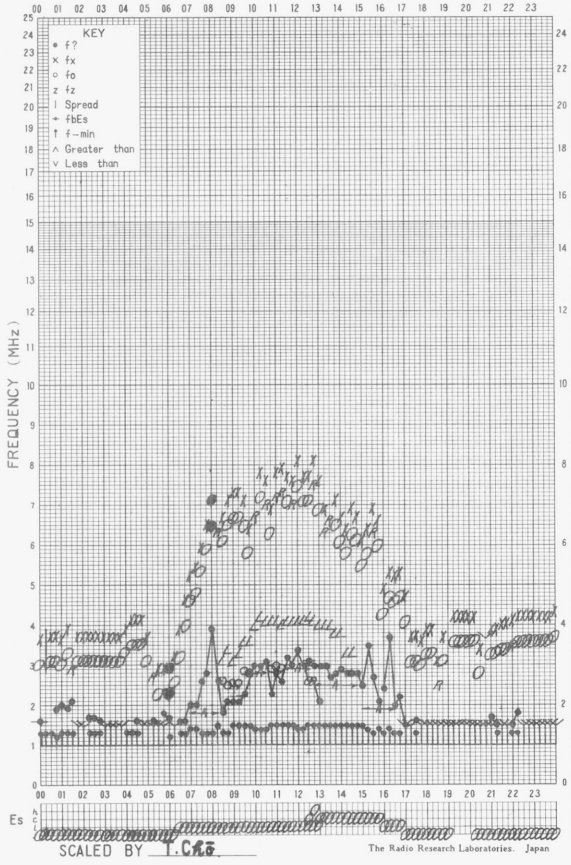
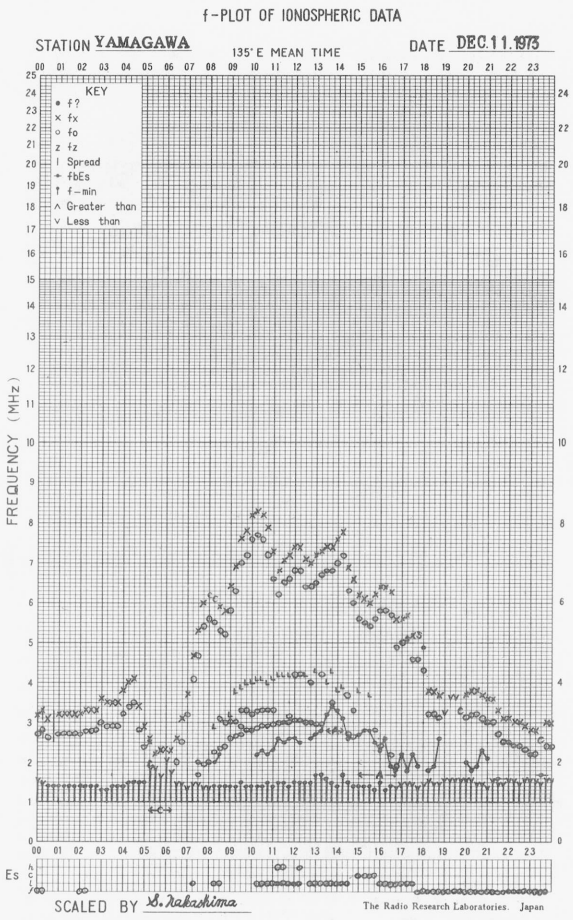


SCALED BY T. Ono

The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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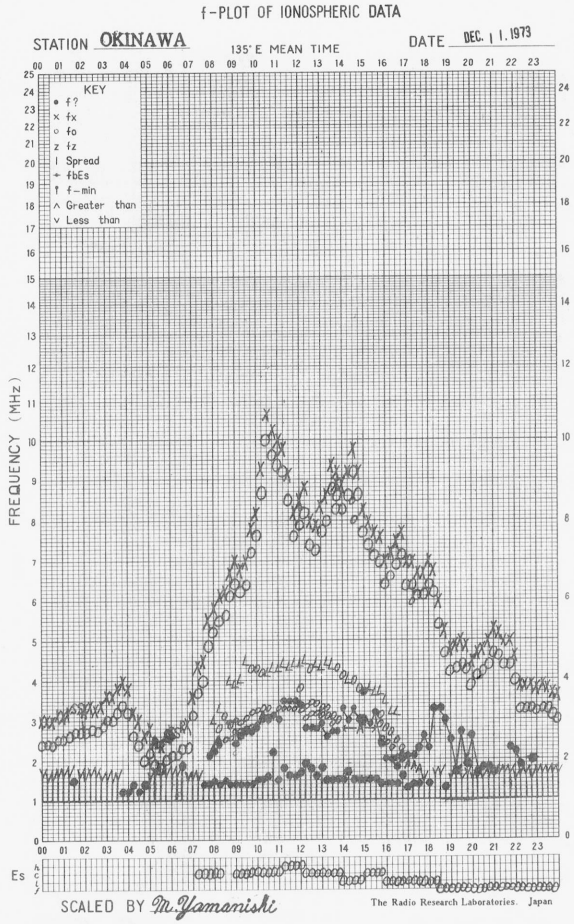
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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SCALED BY M. Yamanishi
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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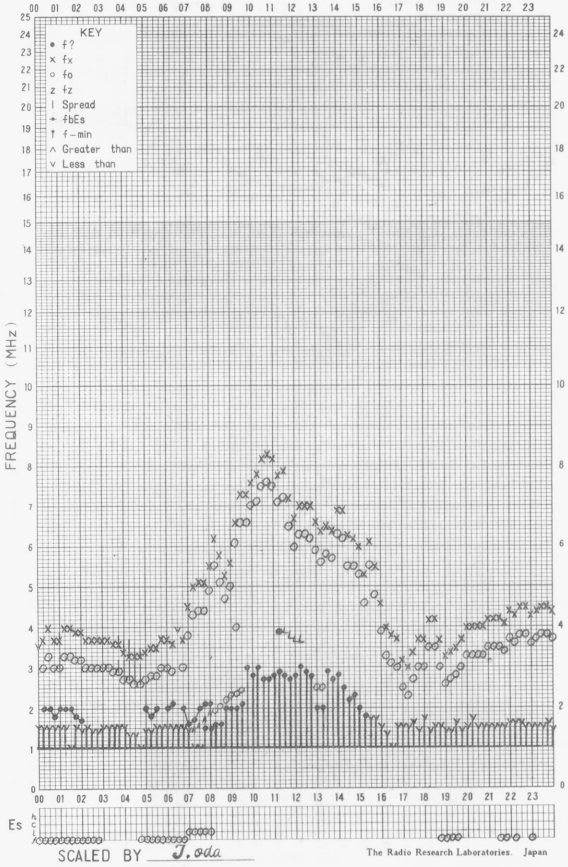

SCALED BY T. oda

The Radio Research Laboratories. Japan

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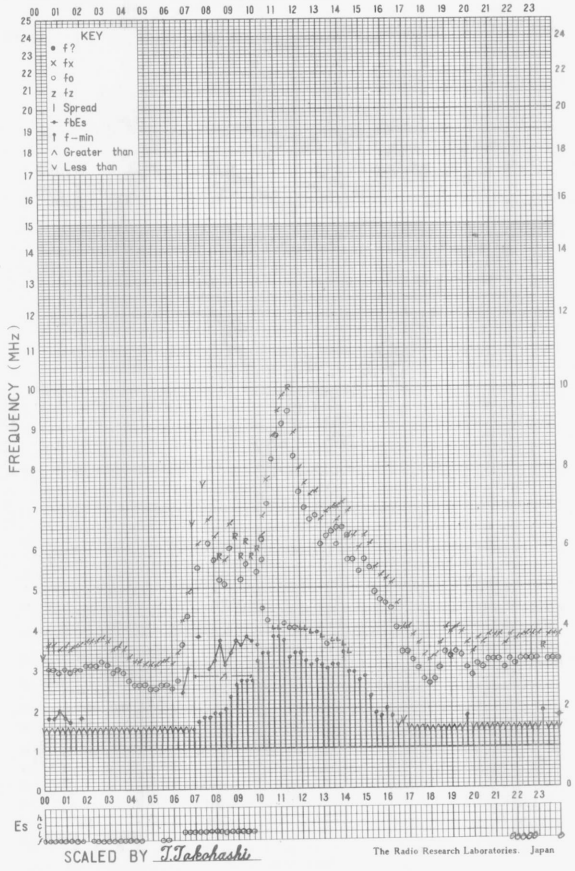

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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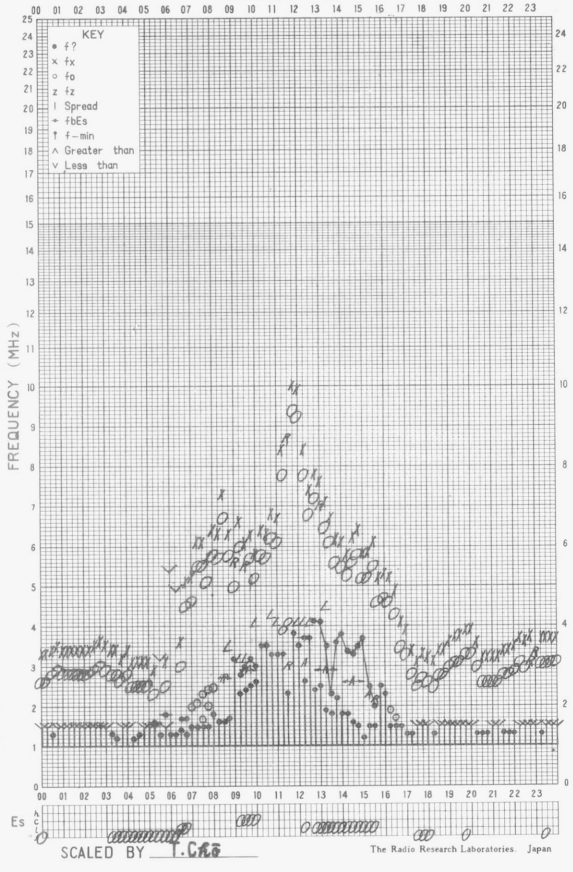
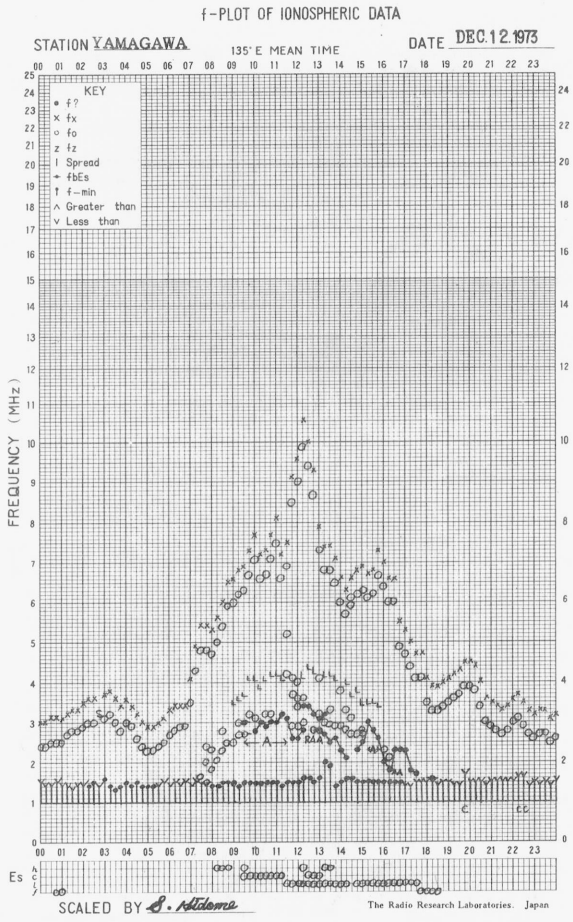


SCALED BY T. Ch5

The Radio Research Laboratories. Japan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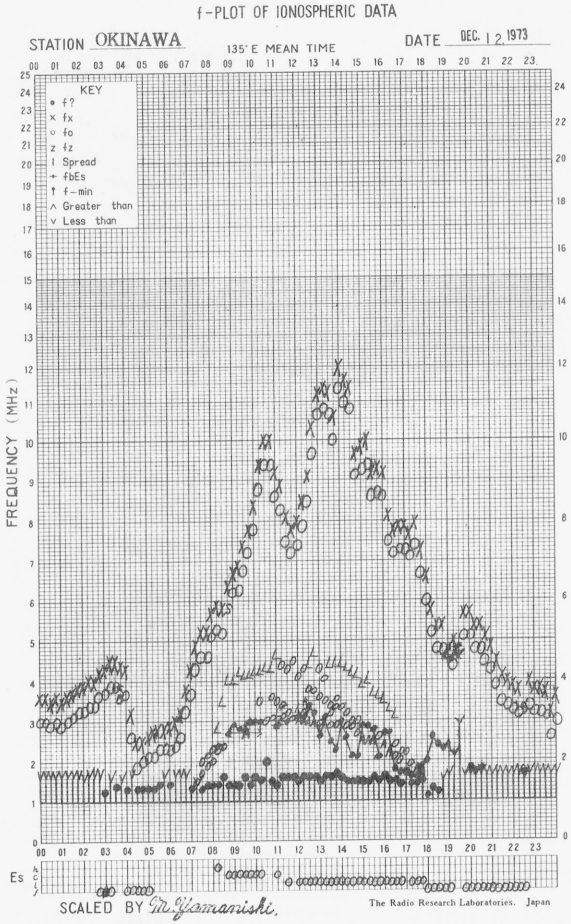
SCALED BY S. Ishidome
The Radio Research Laboratories. Japan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DATE DEC. 12. 1973
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FREQUENCY (MHz)
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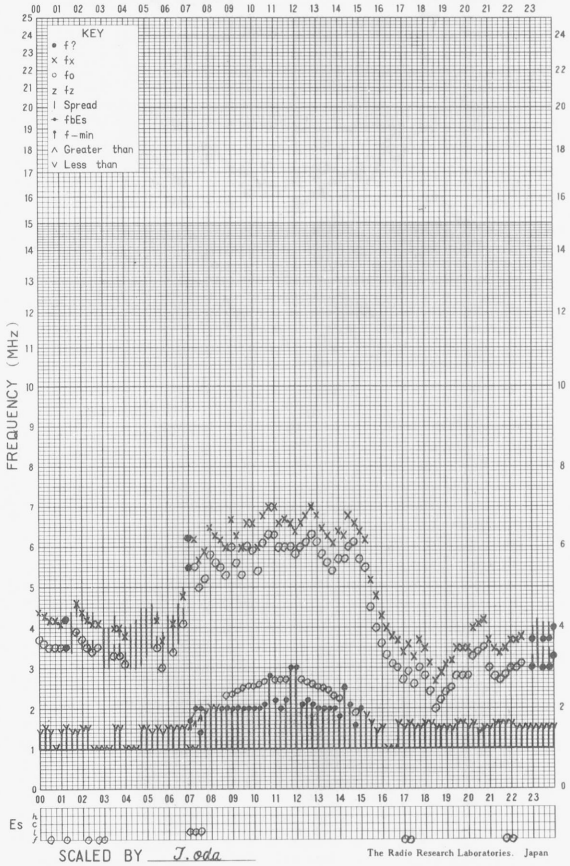
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC. 13. 1973



SCALED BY T. Oda

The Radio Research Laboratories. Japan

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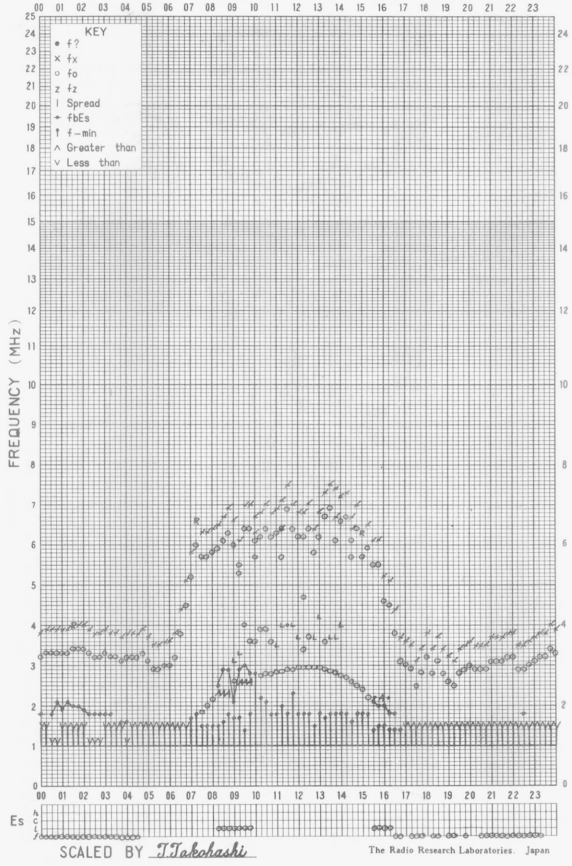

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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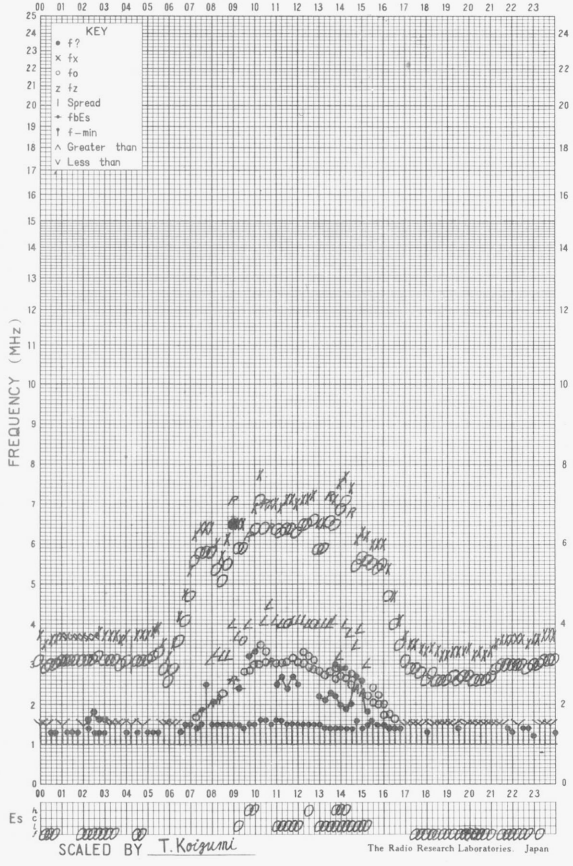

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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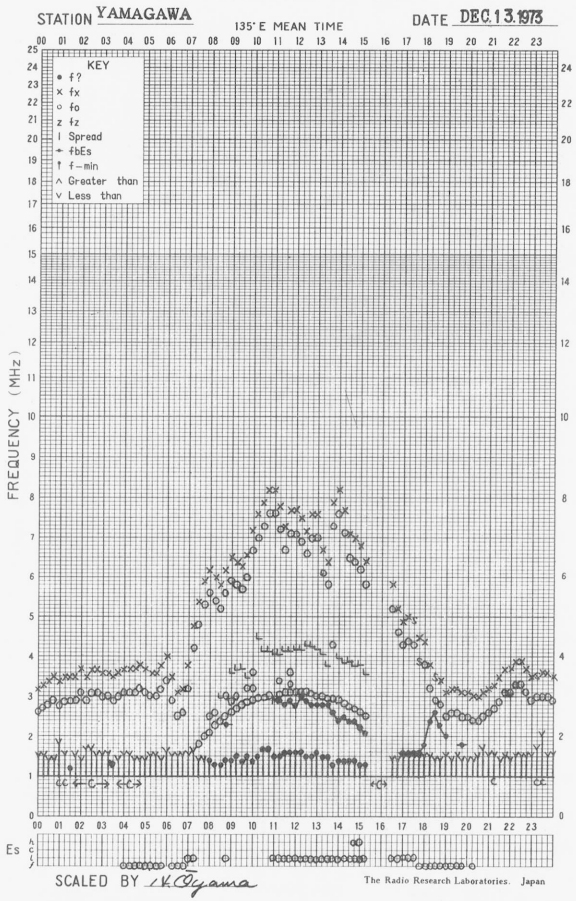

SCALED BY K. Ogama

The Radio Research Laboratories. Japan

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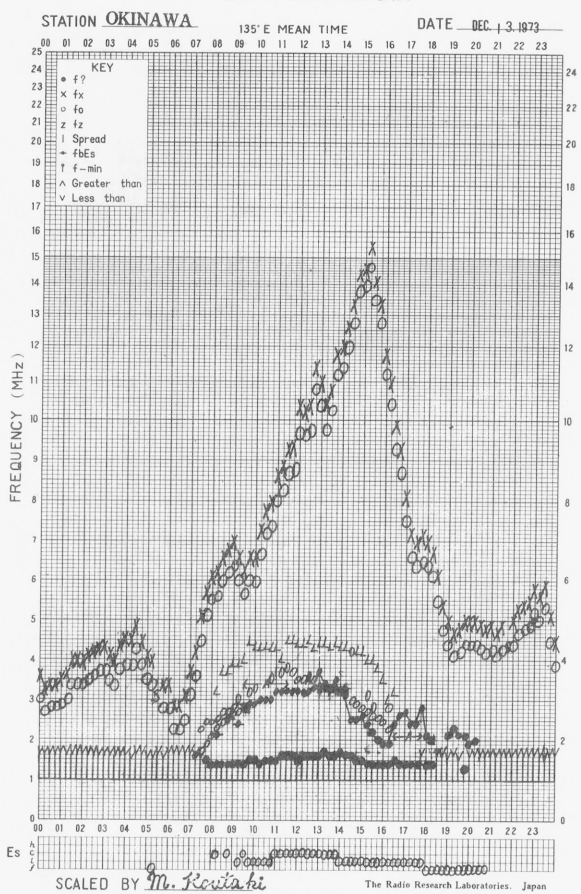

SCALED BY M. Kovitaki

The Radio Research Laboratories. Japan

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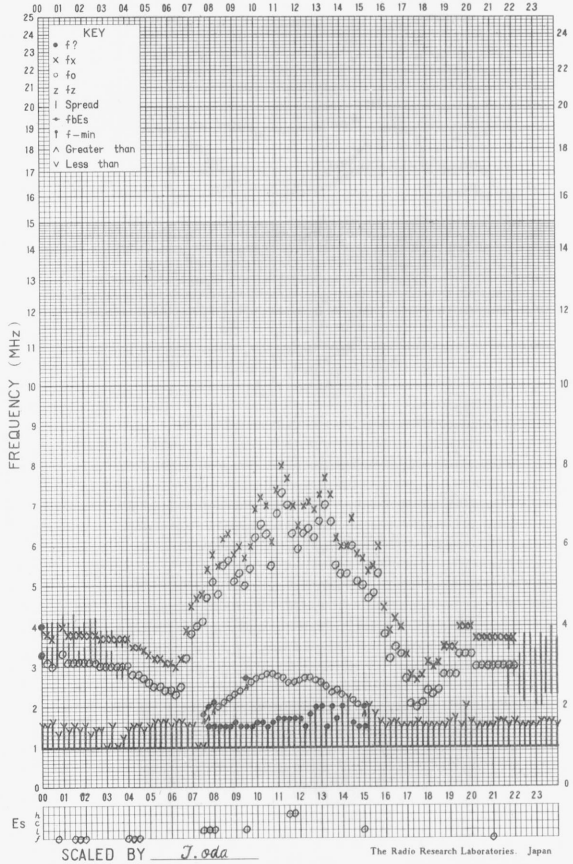

SCALED BY J. oda

The Radio Research Laboratories. Japan

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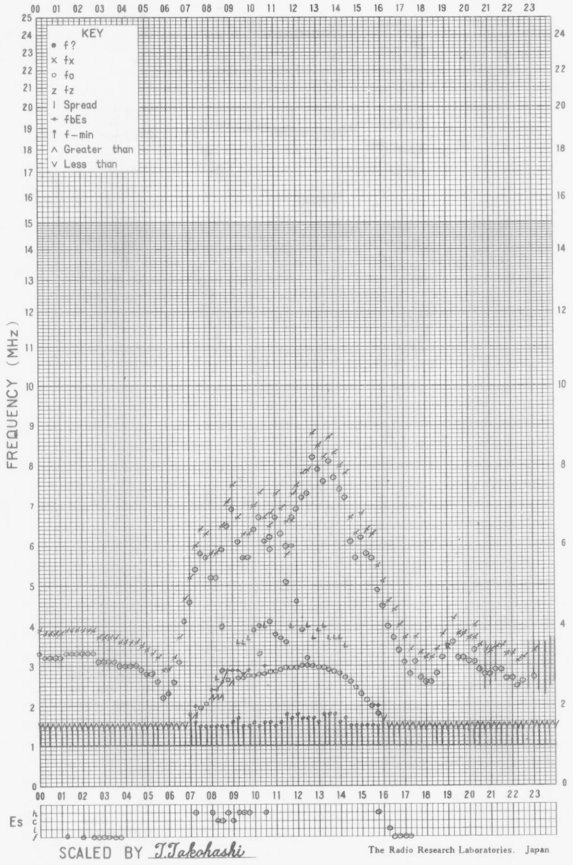

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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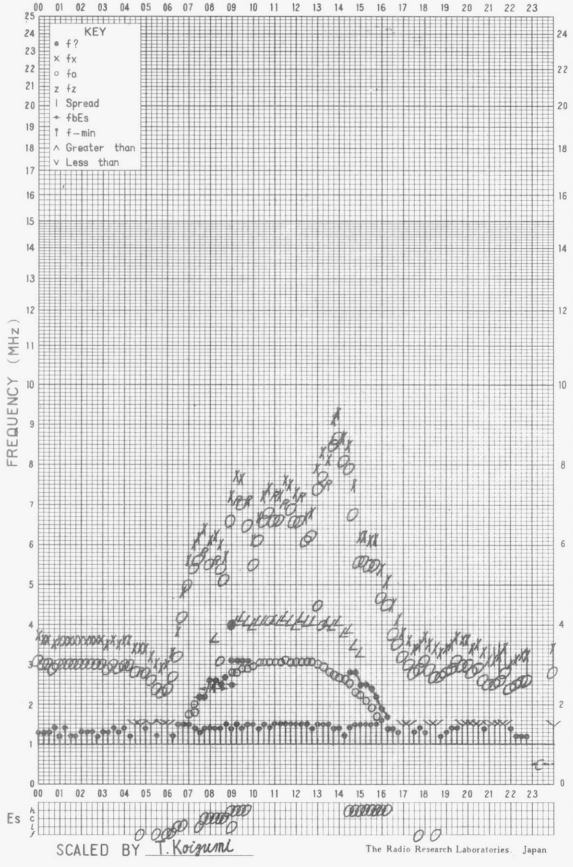

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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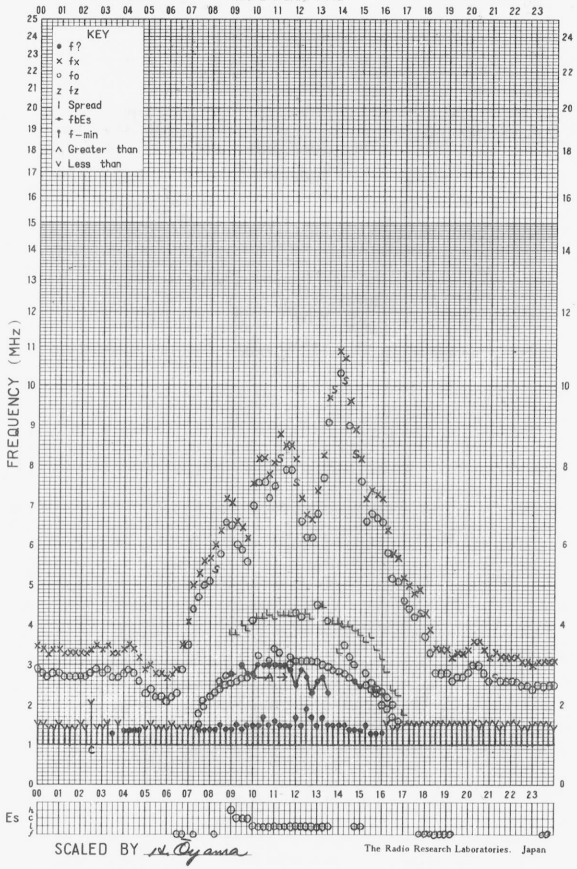
STATION YAMAGAWA

135°E MEAN TIME

DATE DEC. 14 1973



SCALED BY H. Ogawa

The Radio Research Laboratories. Japan

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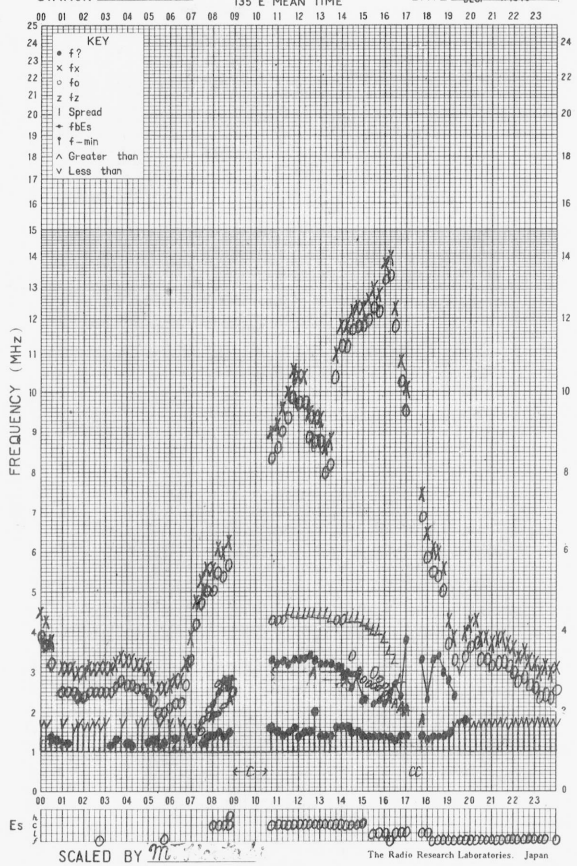

SCALED BY

The Radio Research Laboratories. Japan

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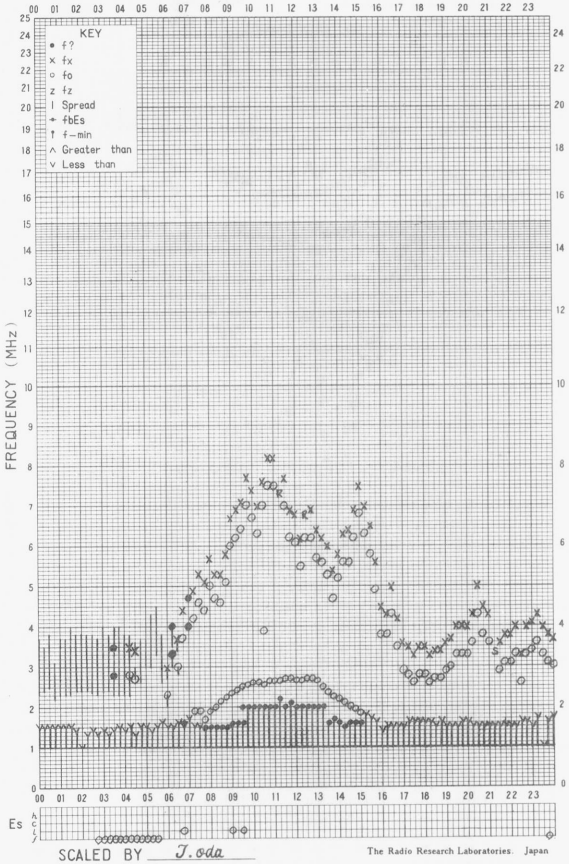

SCALED BY J. oda

The Radio Research Laboratories. Japan

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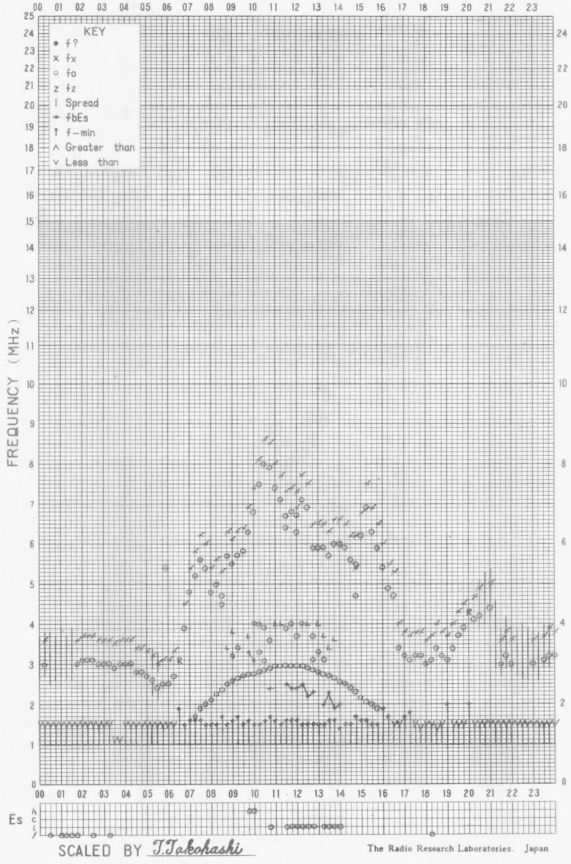

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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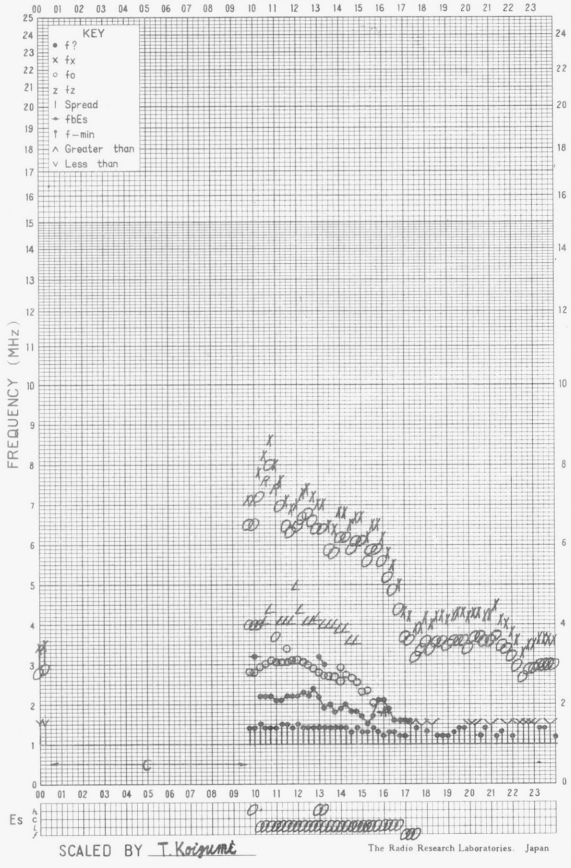

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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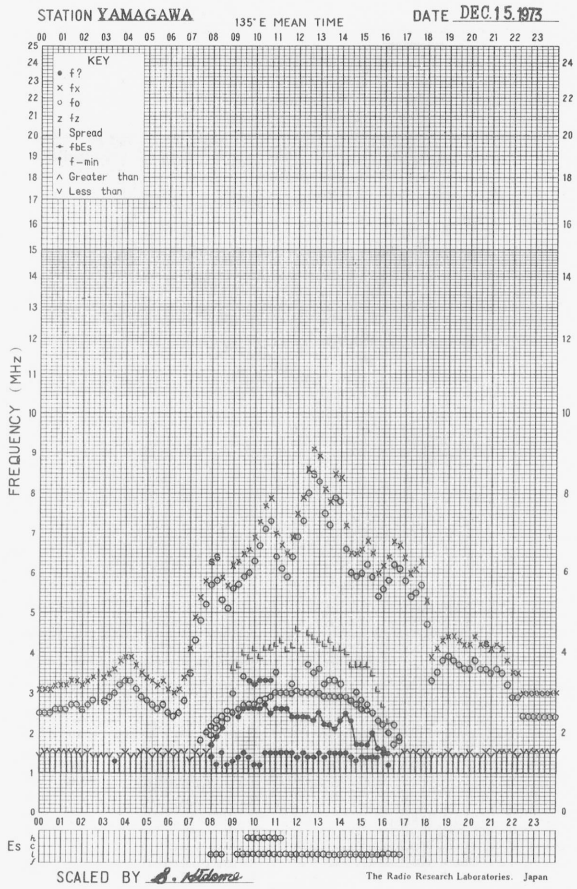

SCALED BY S. Kitdome

The Radio Research Laboratories. Japan

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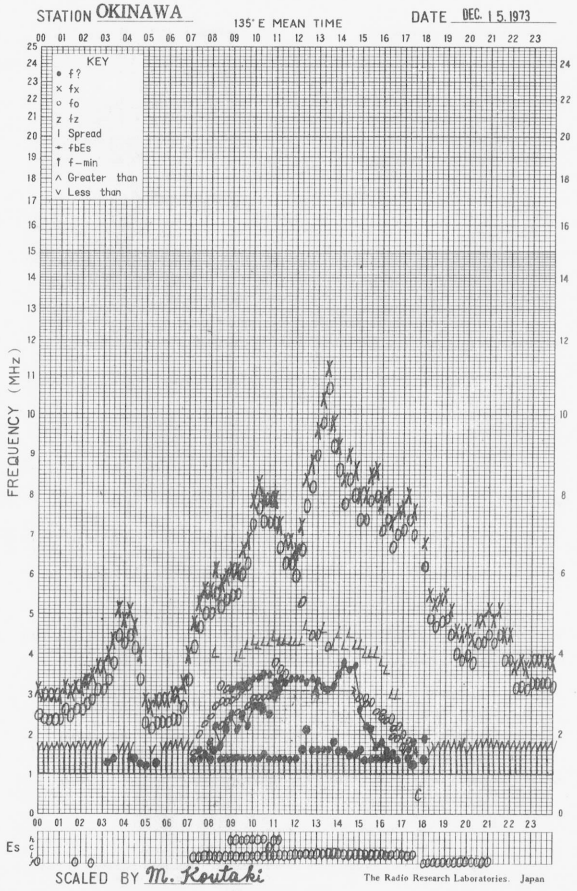

SCALED BY M. Koutaki

The Radio Research Laboratories. Japan

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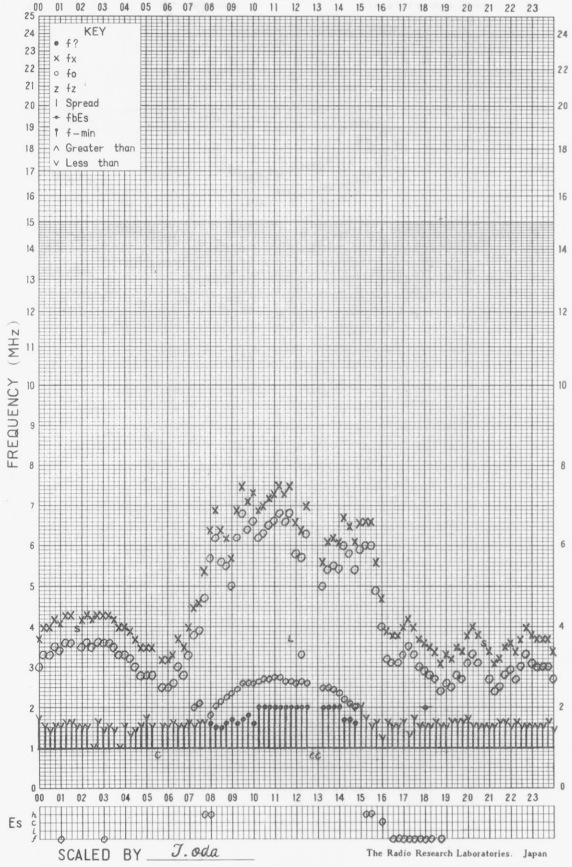

SCALED BY J. Oda

The Radio Research Laboratories. Japan

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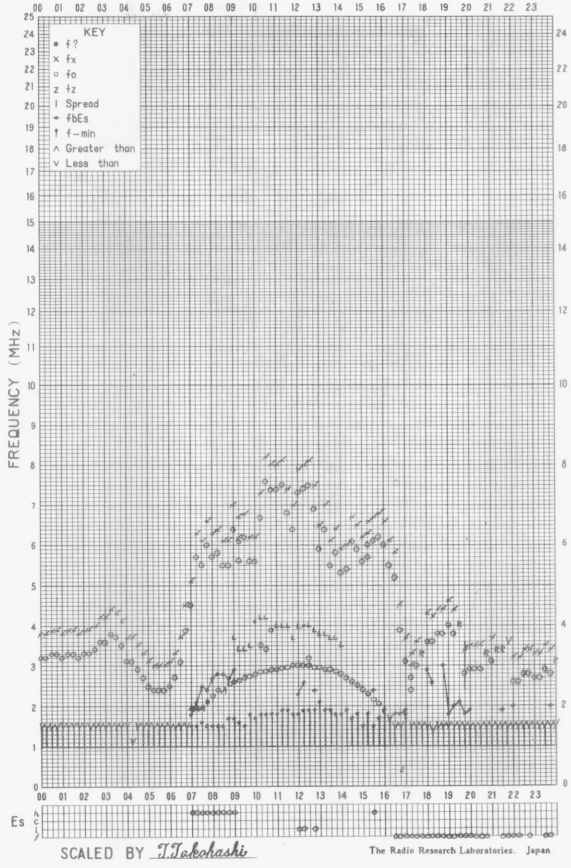

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The Radio Research Laboratories. Japan

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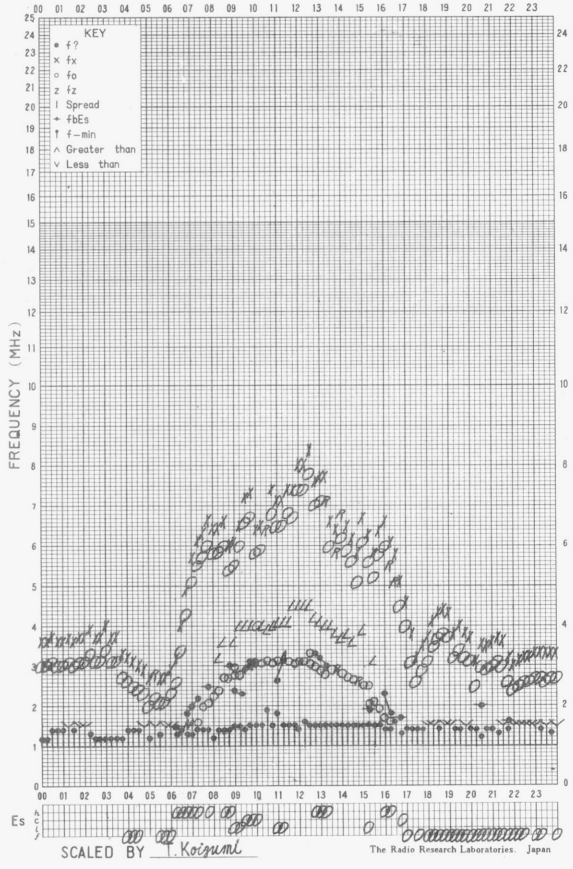
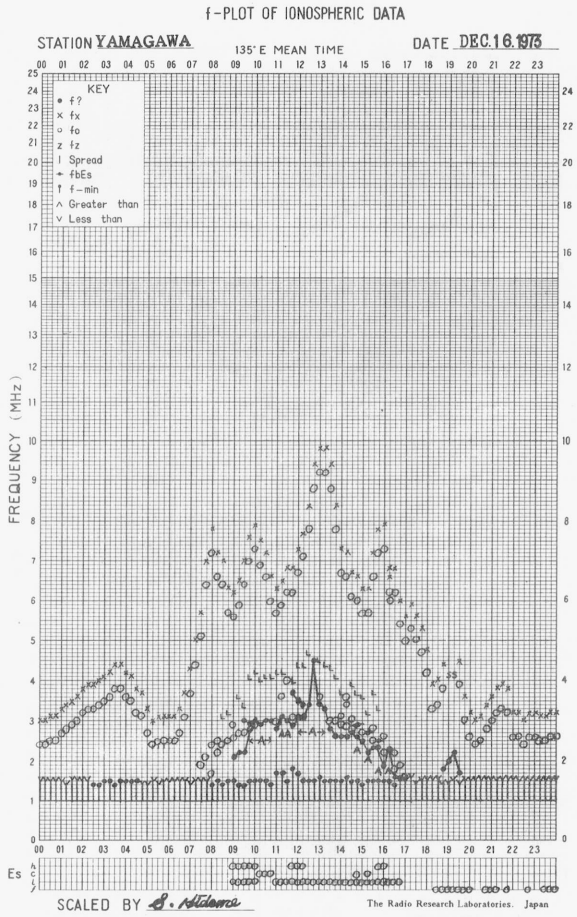


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan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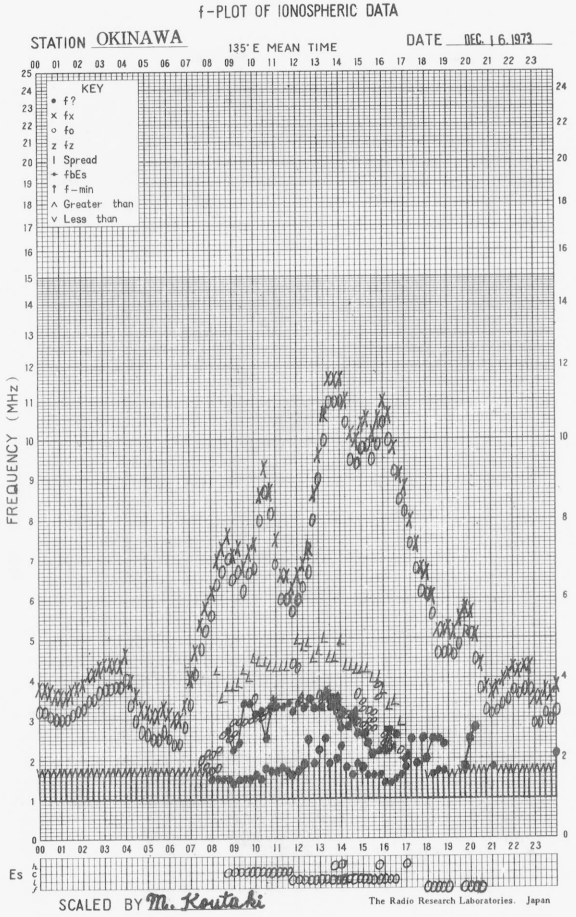
SCALED BY S. Nitsuma
The Radio Research Laboratories. Japan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SCALED BY M. Kouteki
The Radio Research Laboratories. Japan

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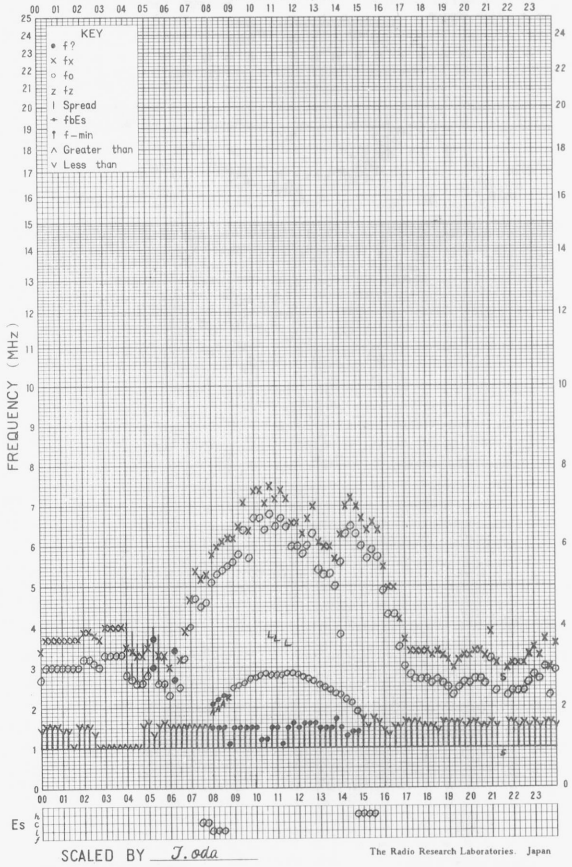

SCALED BY J. Oda

The Radio Research Laboratories. Japan

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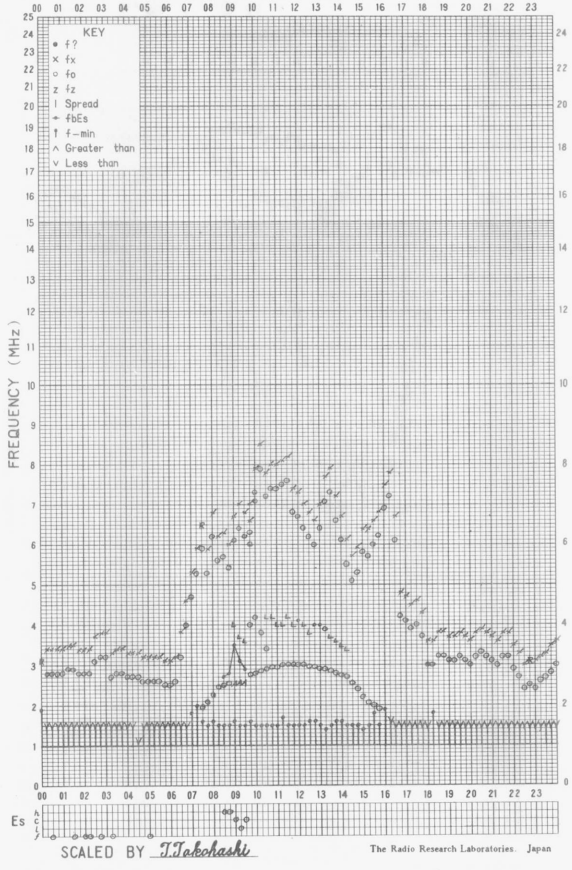

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The Radio Research Laboratories. Japan

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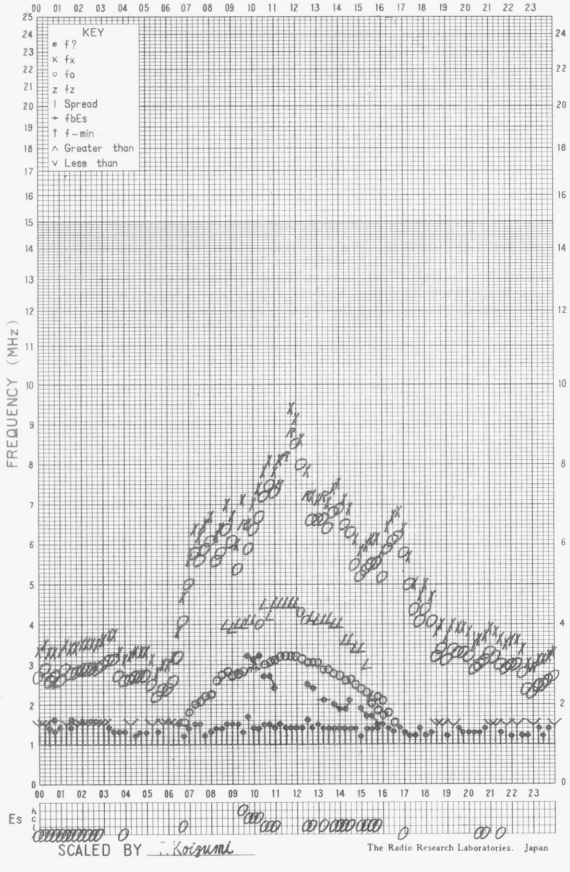
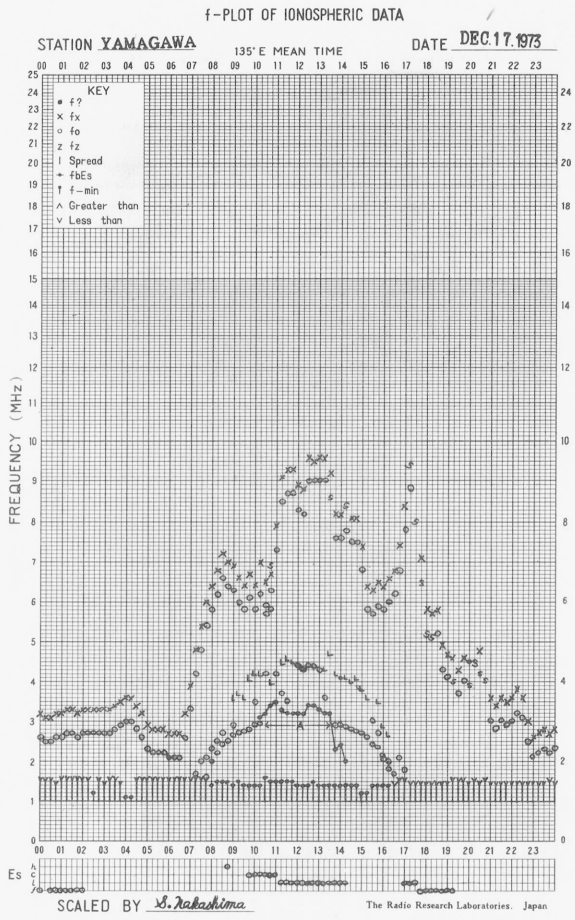


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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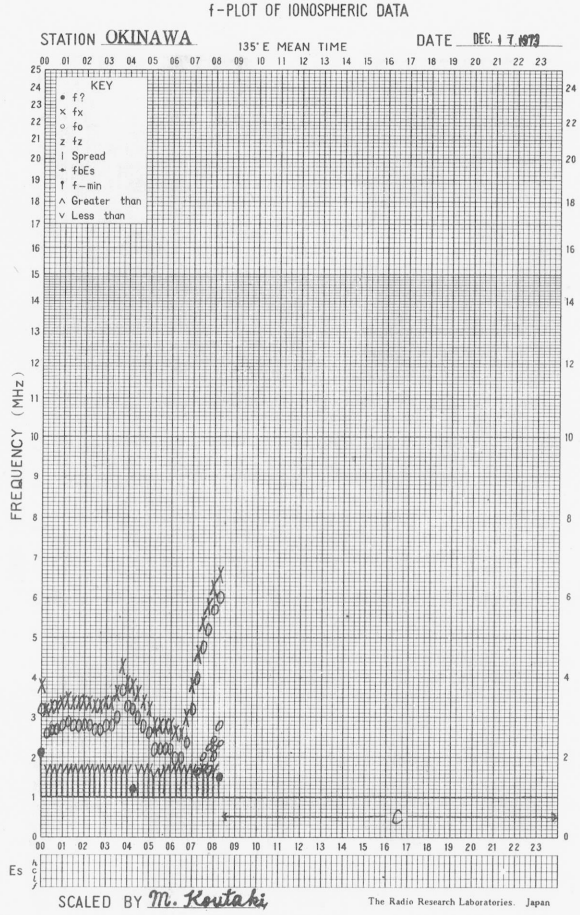
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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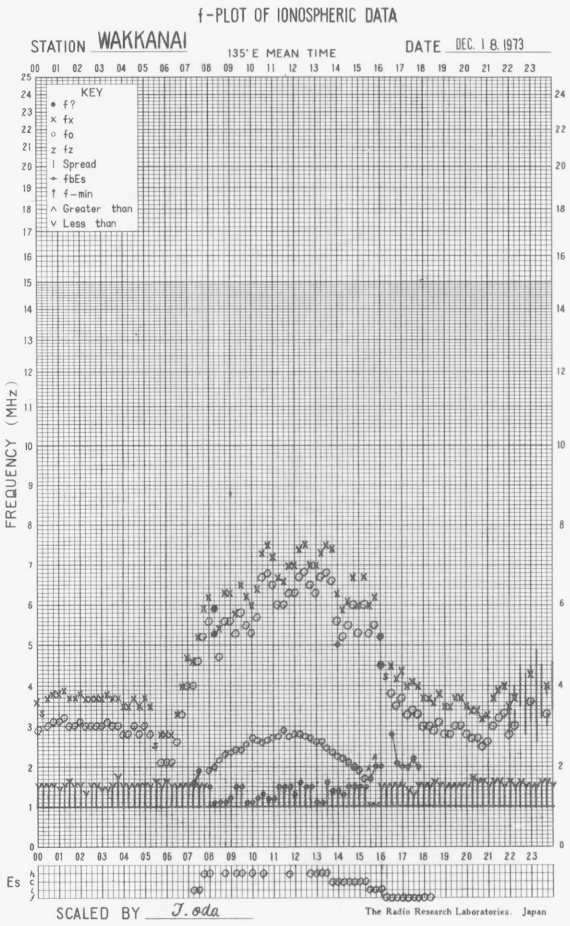
SCALED BY M. Kouteki
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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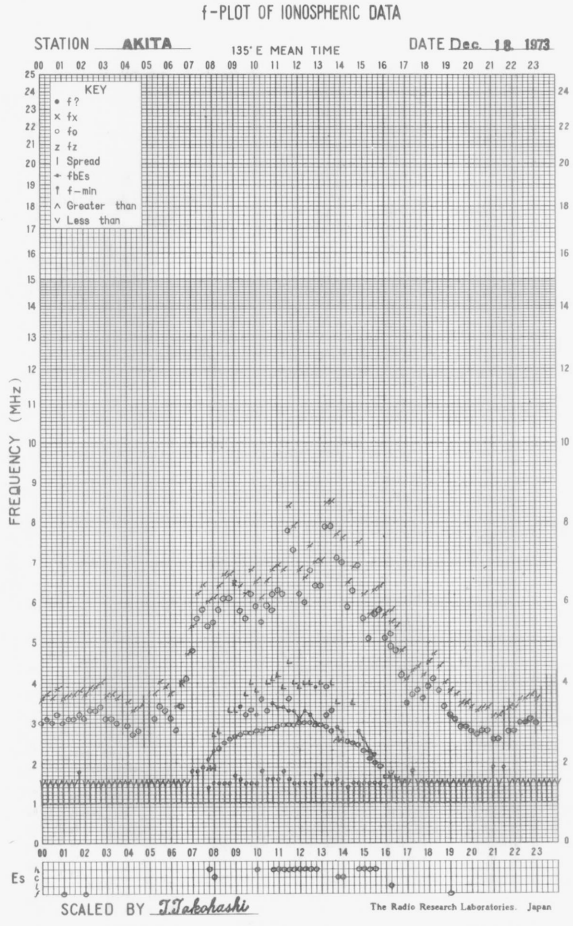
SCALED BY J. oda
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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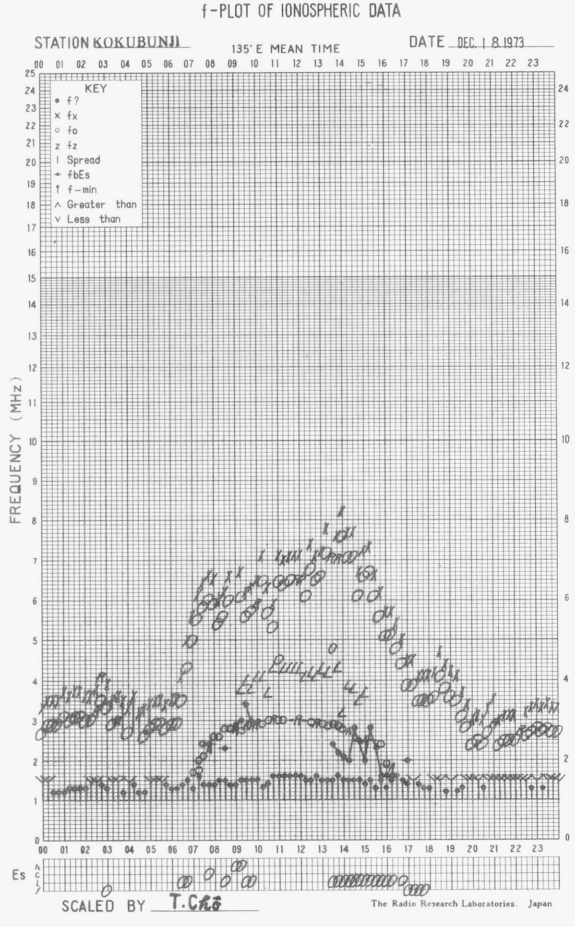
SCALED BY T.Takahashi
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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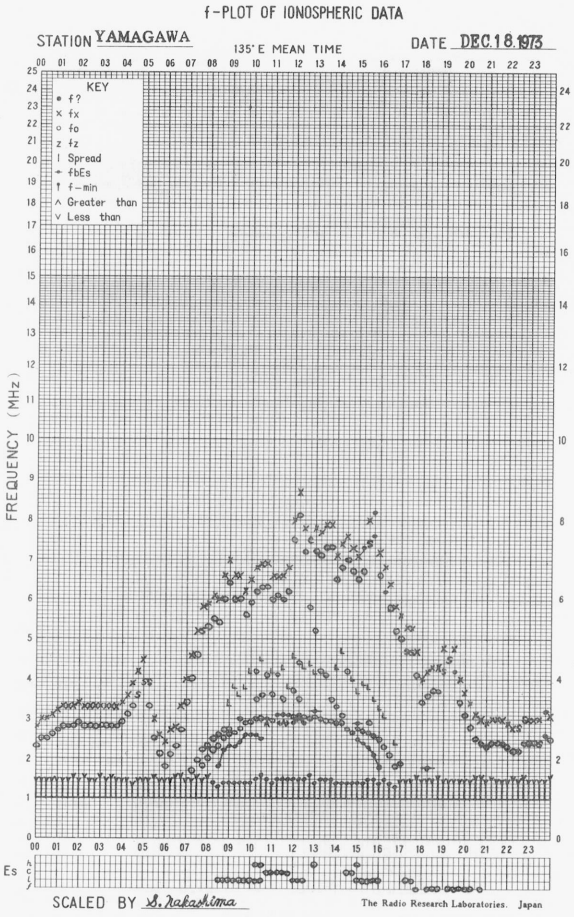
SCALED BY T.Ch
The Radio Research Laboratories. Japan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135° E MEAN TIME
DATE DEC. 18. 1973
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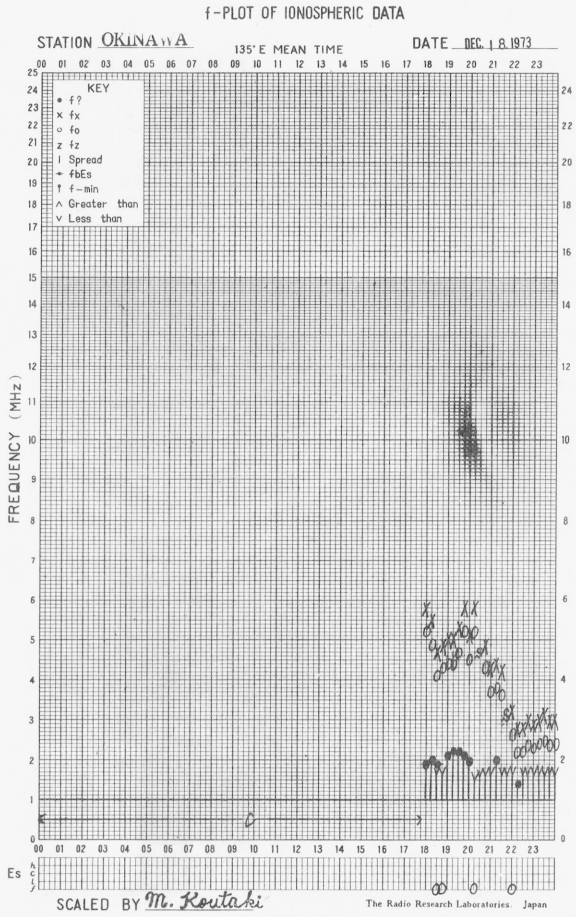
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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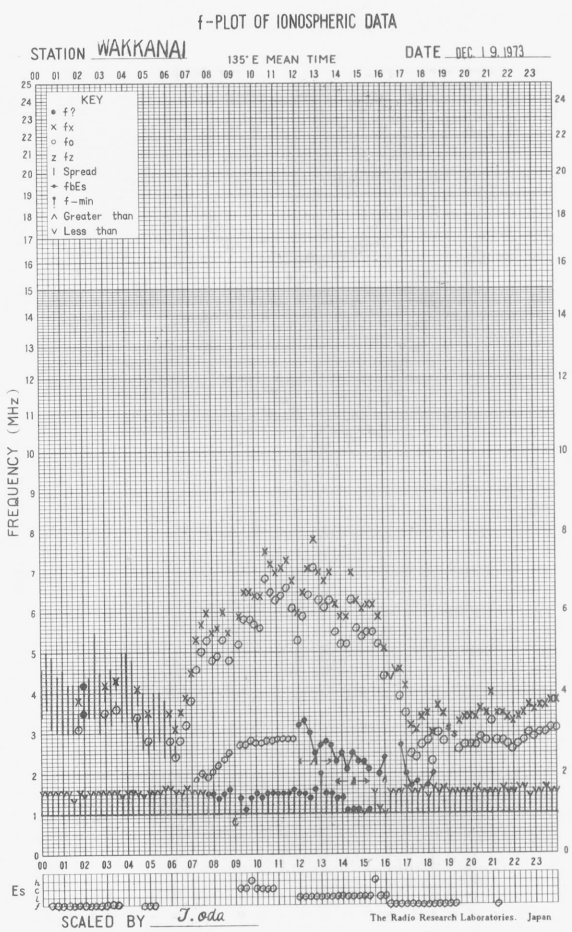
SCALED BY M. Kouteki
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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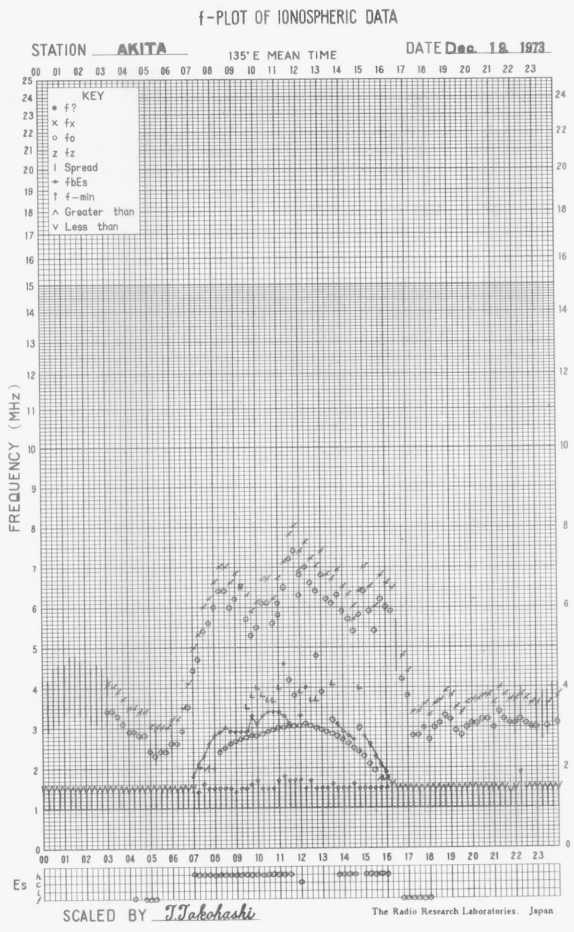
SCALED BY T. oda
The Radio Research Laboratories. Japan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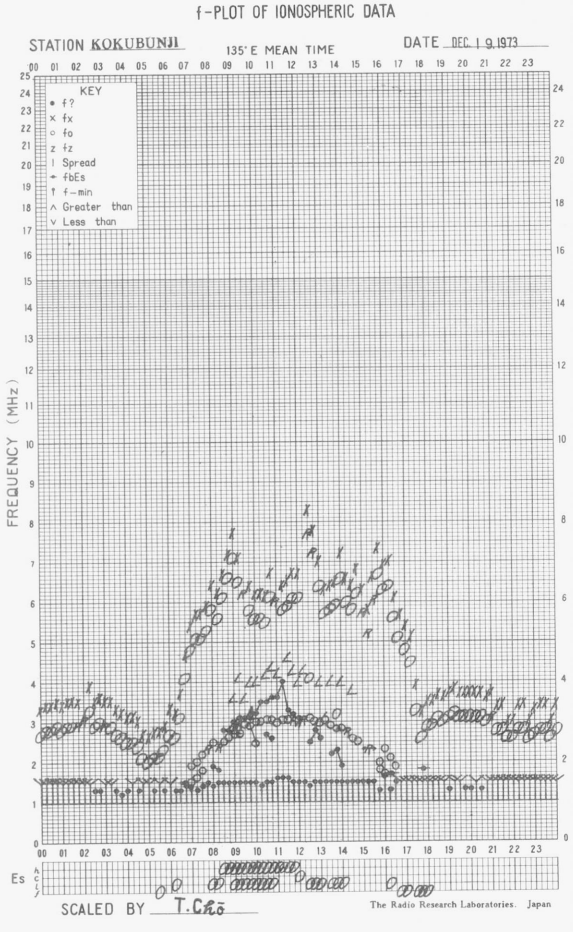
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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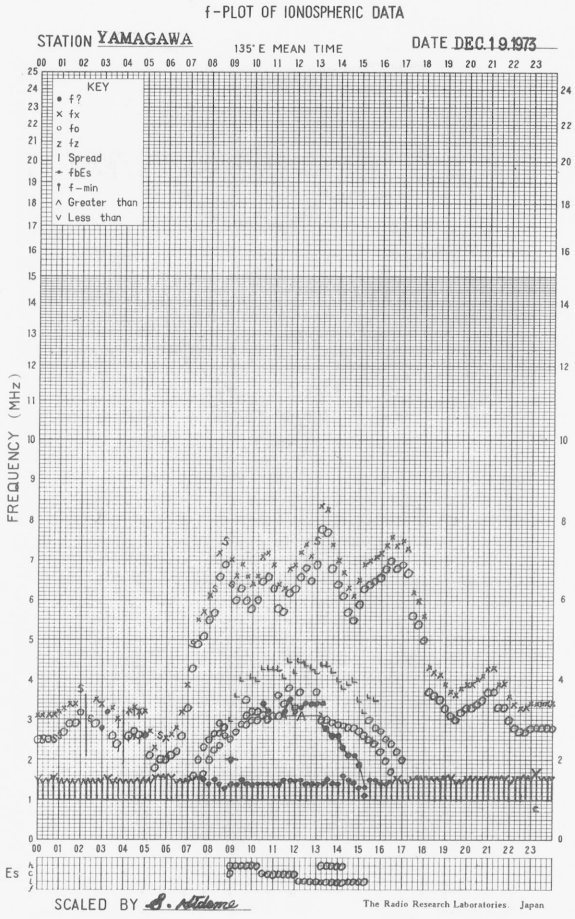
SCALED BY T. Ono
The Radio Research Laboratories. Japan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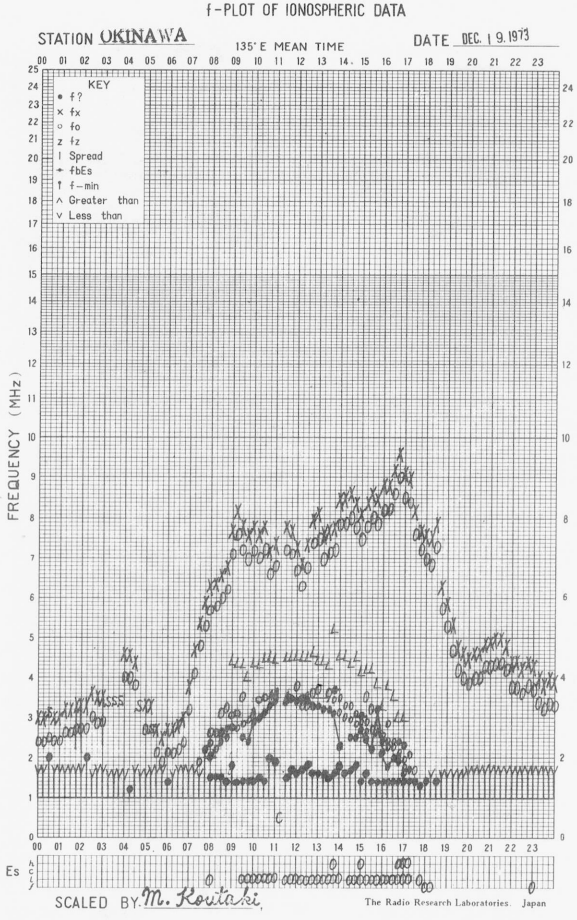
SCALED BY S. Nitademe
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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SCALED BY M. Kouiaki
The Radio Research Laboratories. Japan

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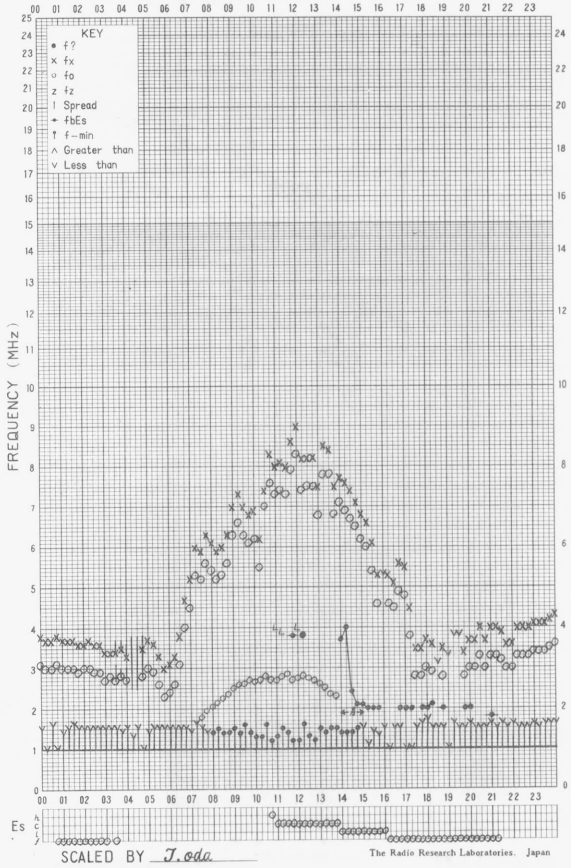

SCALED BY T. oda

The Radio Research Laboratories. Japan

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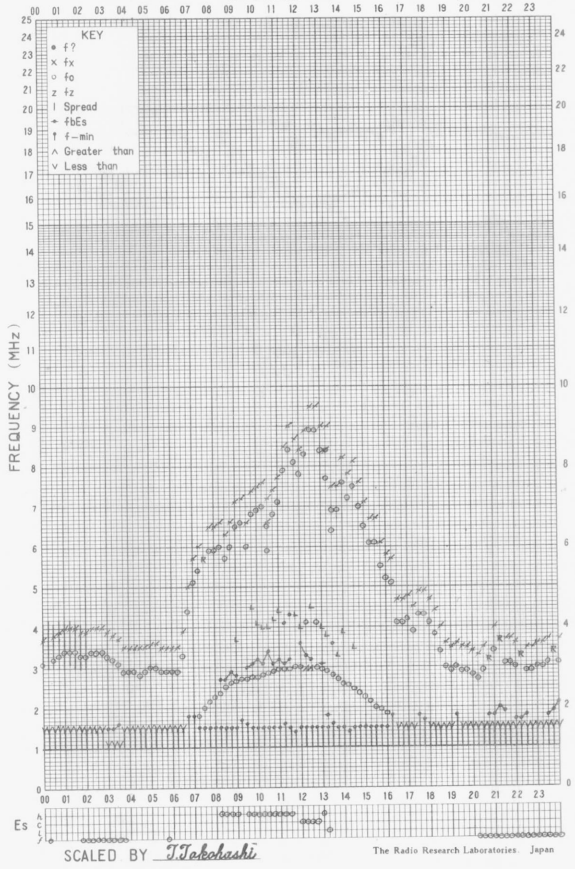

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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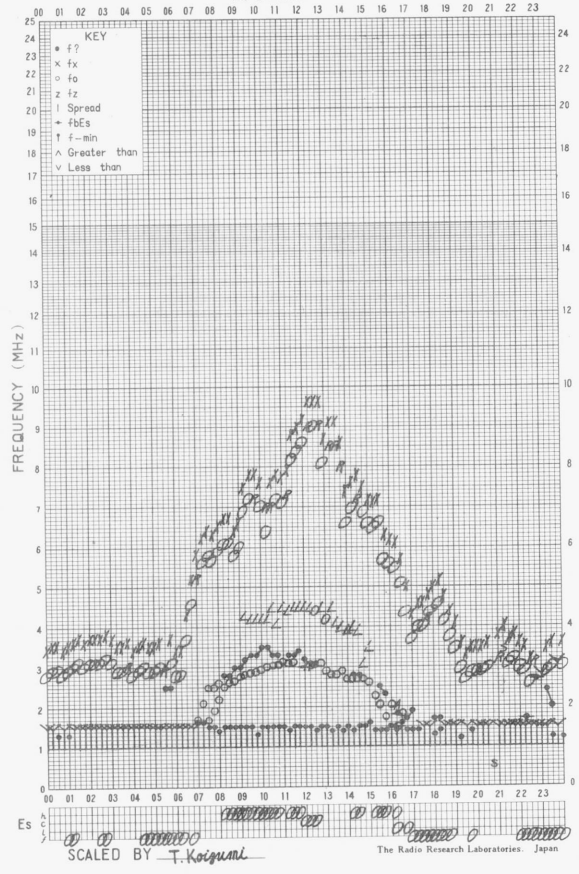

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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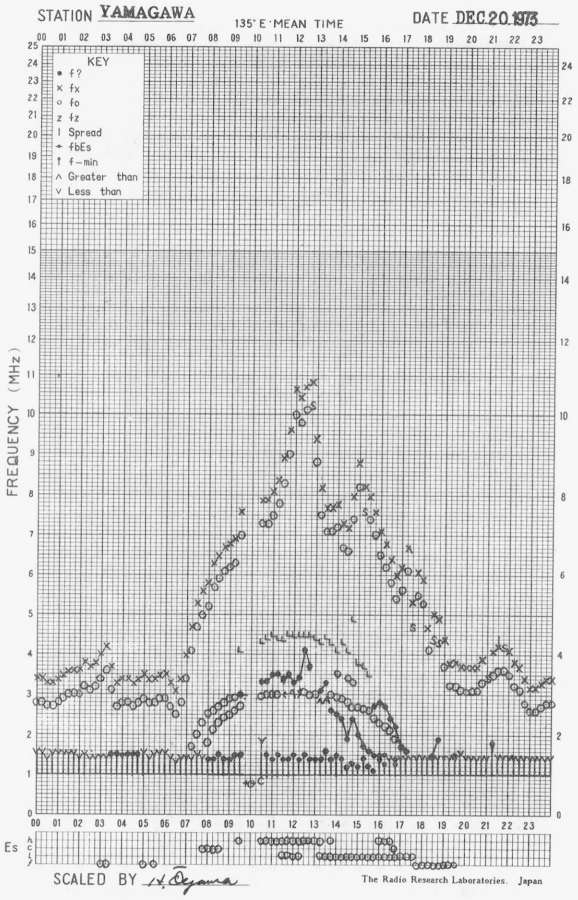

SCALED BY Y. Ogawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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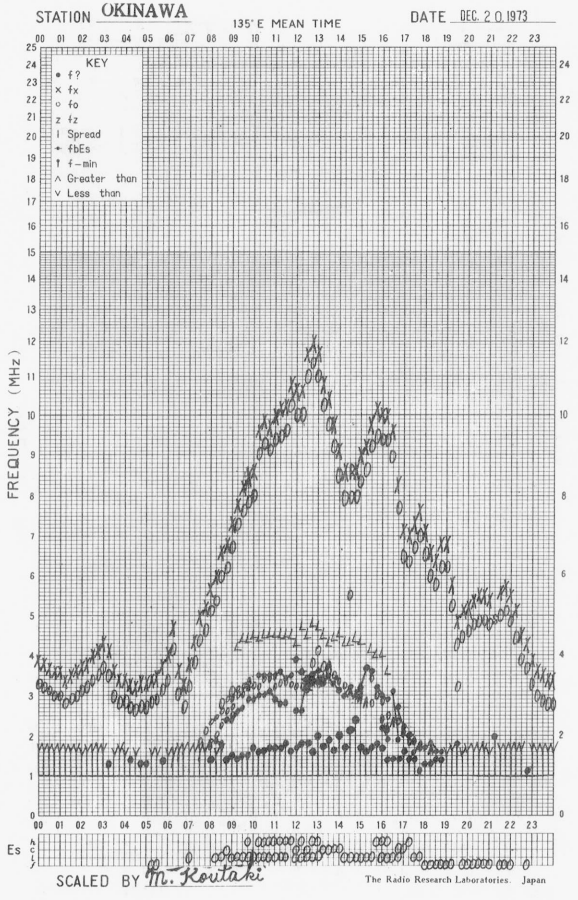

SCALED BY M. Koutaki

The Radio Research Laboratories. Japan

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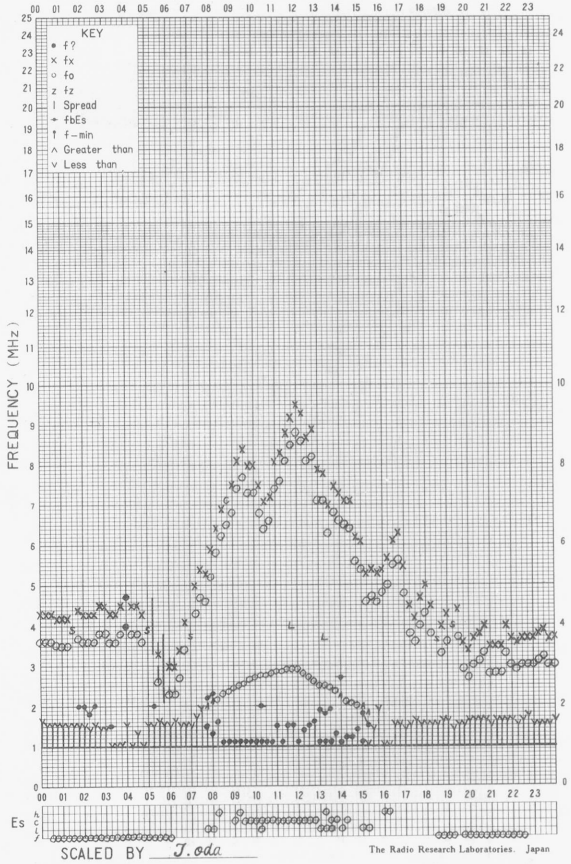
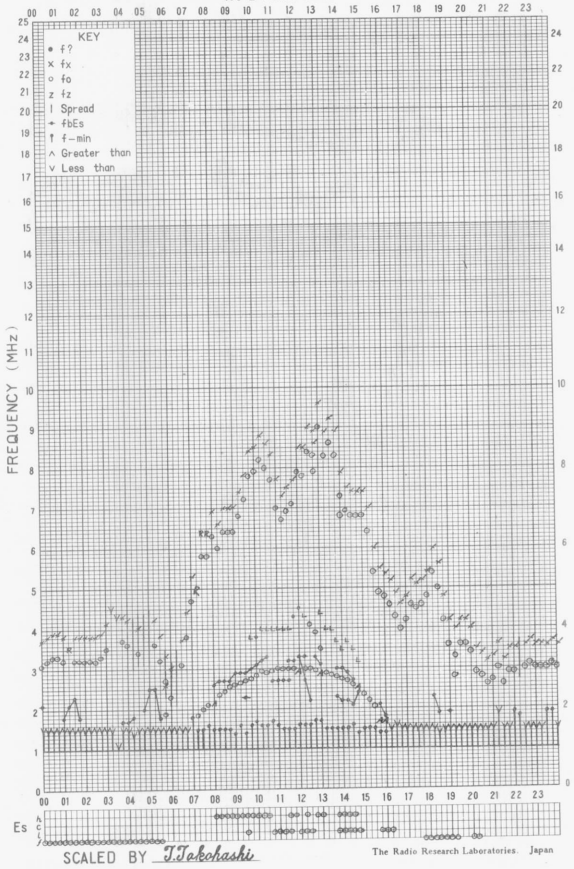


SCALED BY J. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Dec. 21. 1973



SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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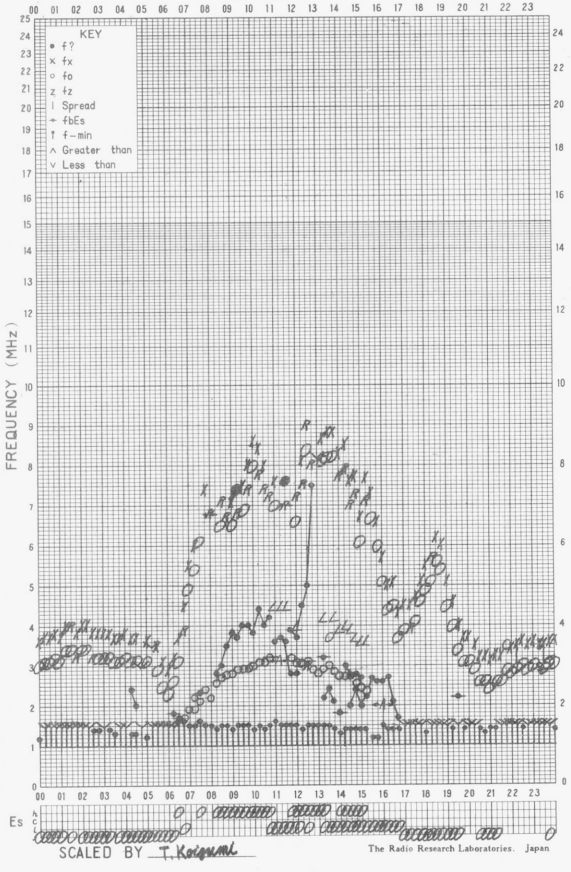
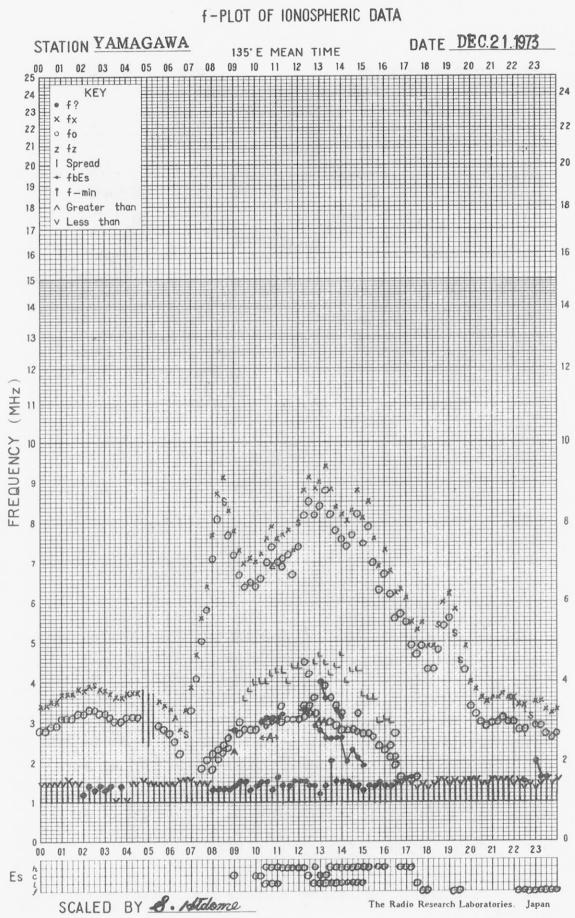


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan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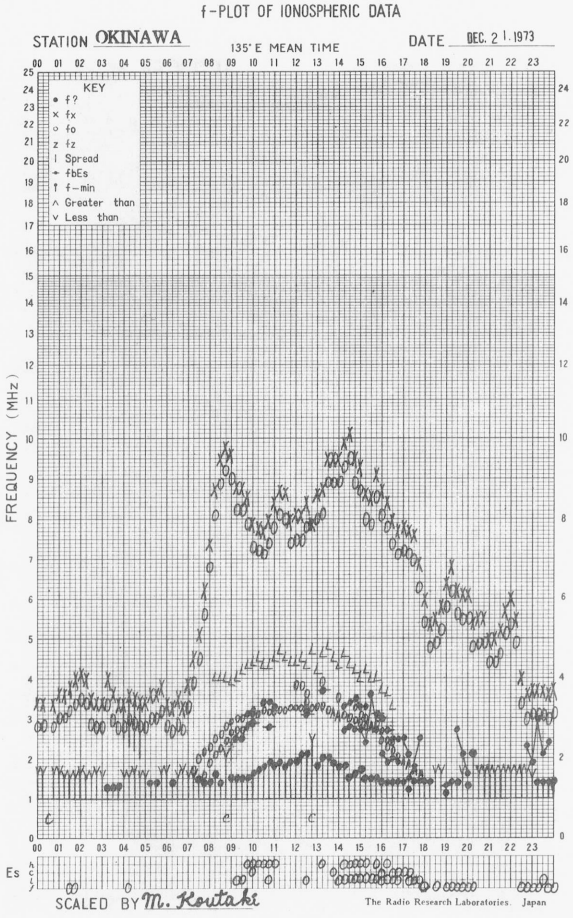
SCALED BY S. Ishidome
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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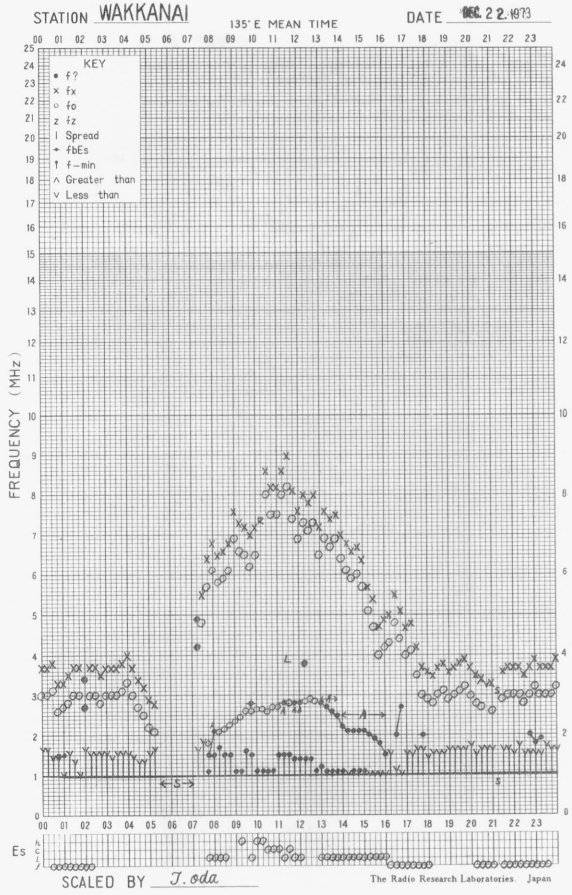
SCALED BY M. Koutaki
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC. 22. 1973



SCALED BY T. oda

The Radio Research Laboratories. Japan

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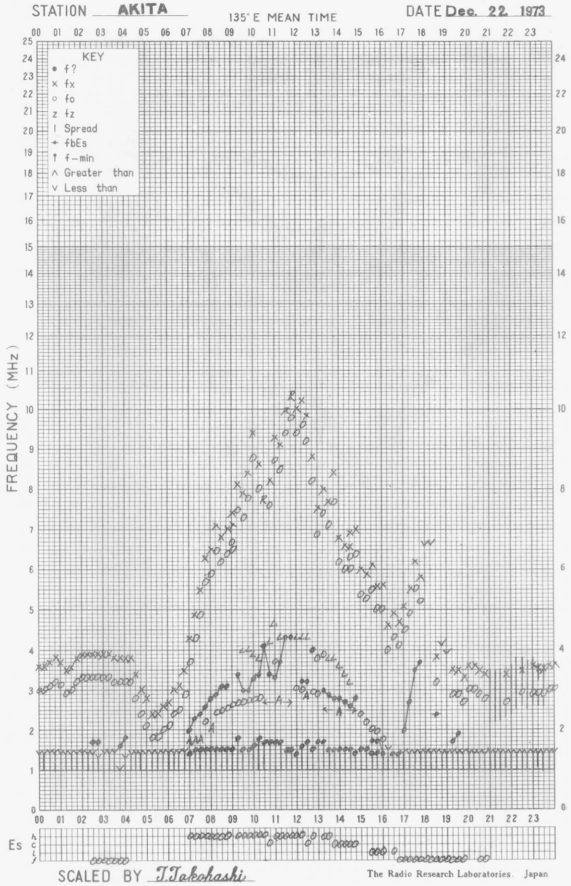

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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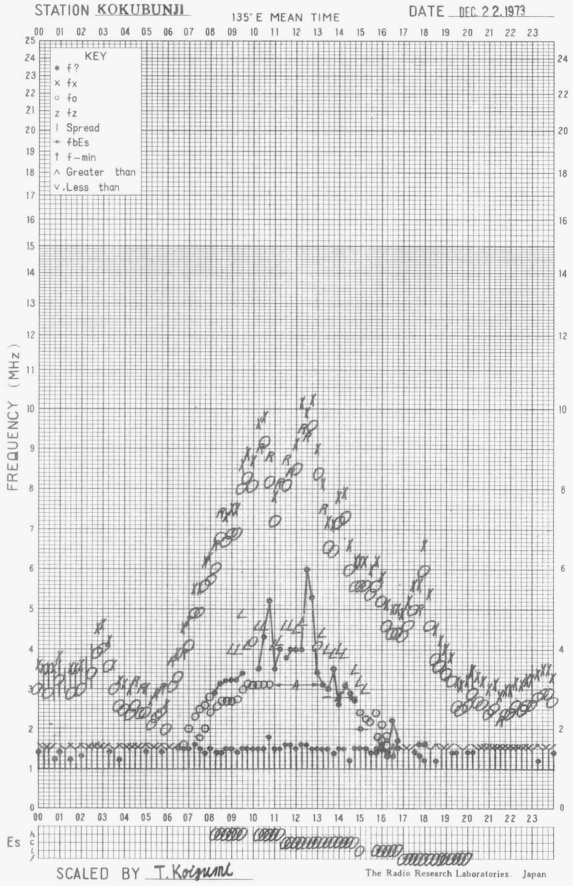
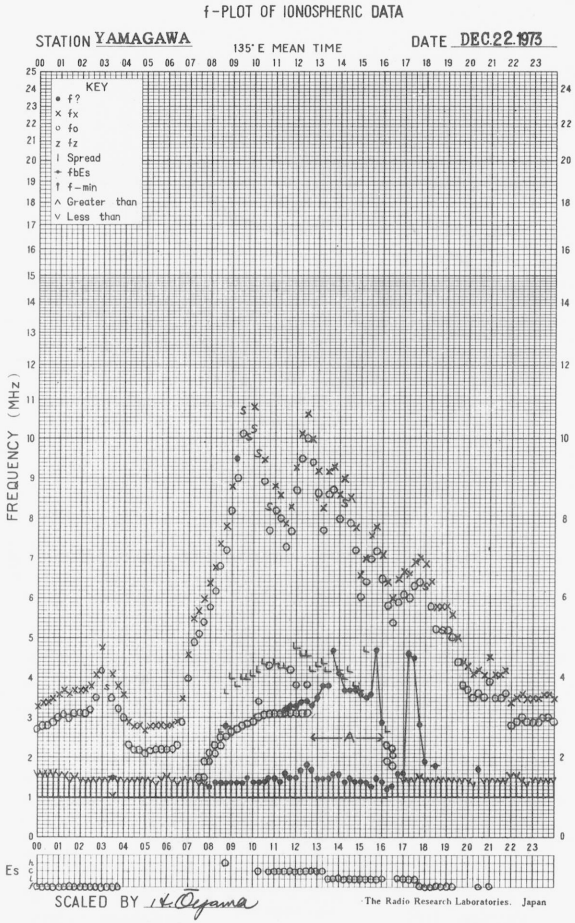


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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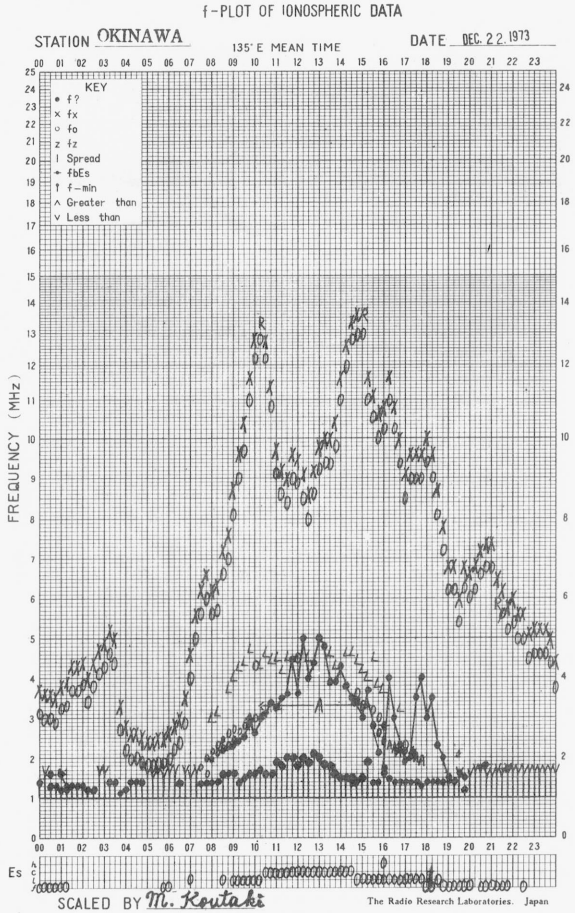
SCALED BY K. Ōyama
The Radio Research Laboratories. Japan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∧ Greater than
∨ Less than
FREQUENCY (MHz)
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SCALED BY M. Koutaki
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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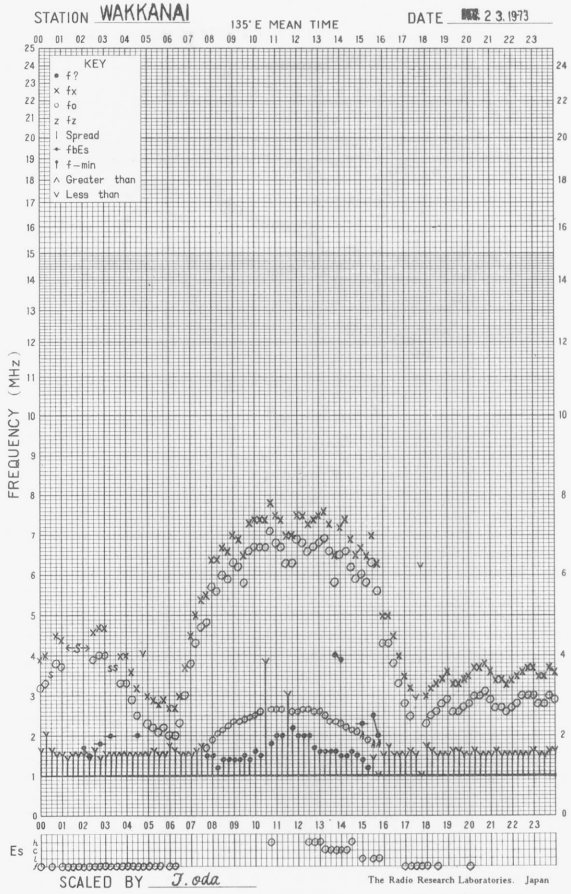

SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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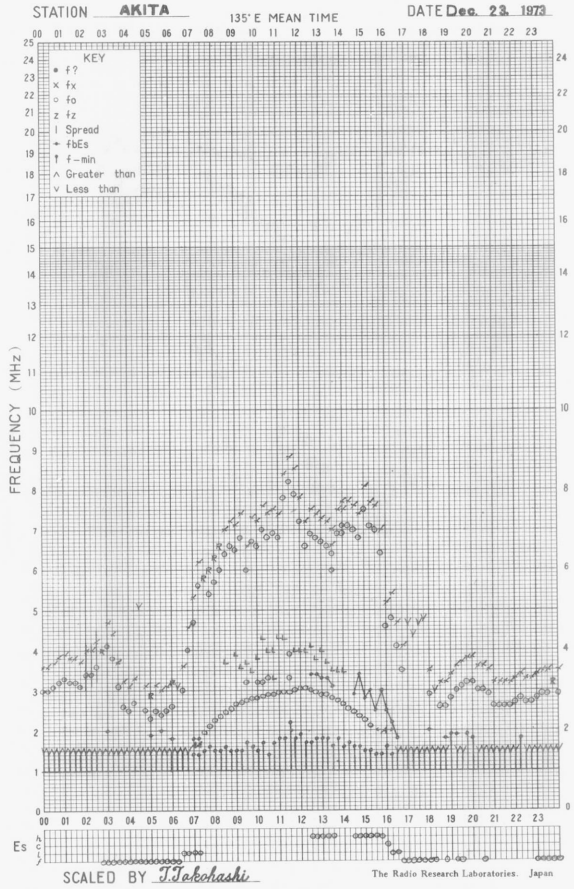

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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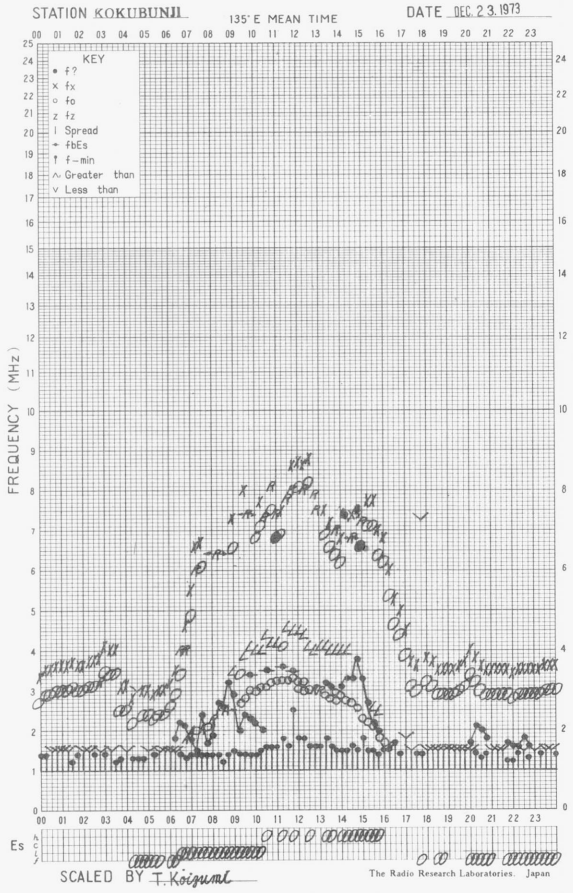

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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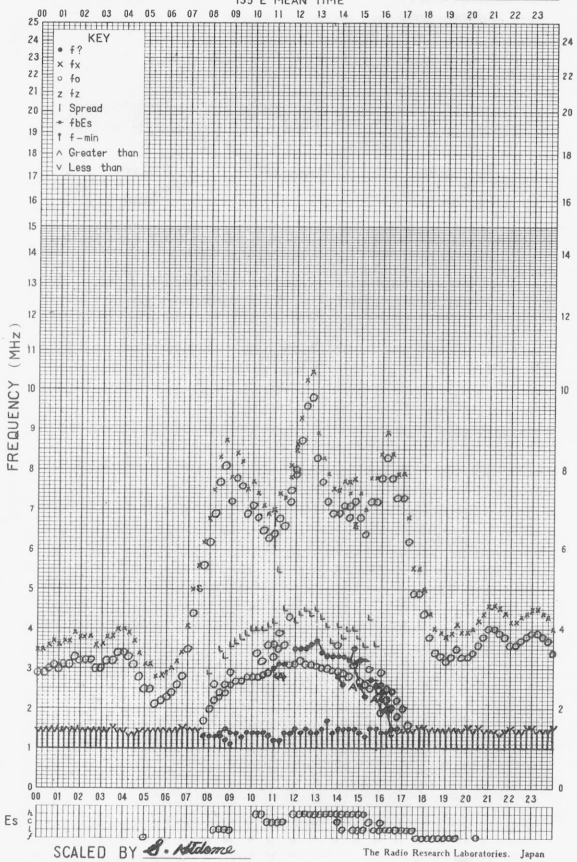

SCALED BY S. Ishidome

The Radio Research Laboratories. Japan

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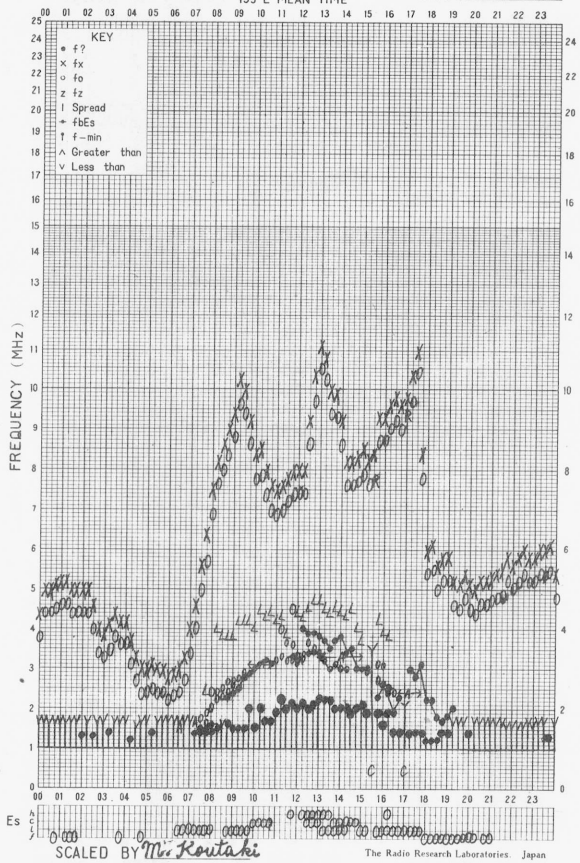

SCALED BY M. Koutaki

The Radio Research Laboratories. Japan

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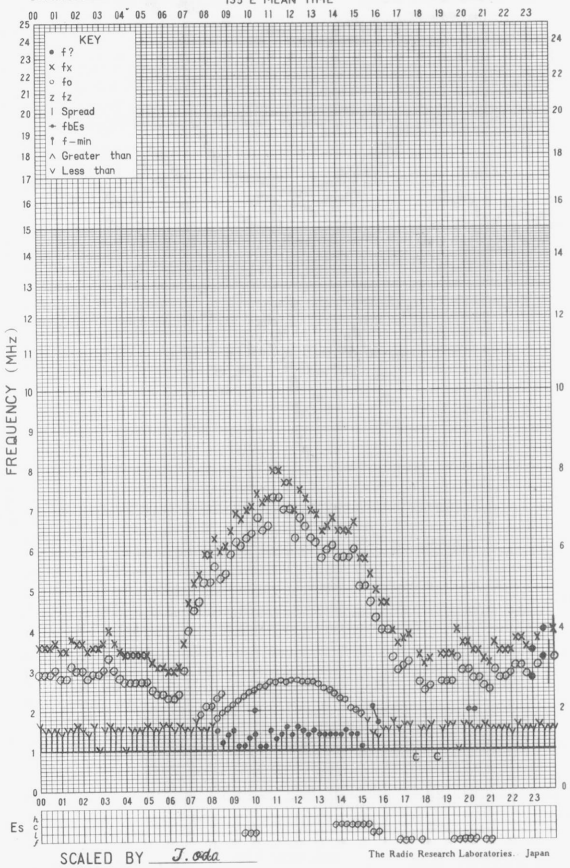

SCALED BY J. oda

The Radio Research Laboratories. Japan

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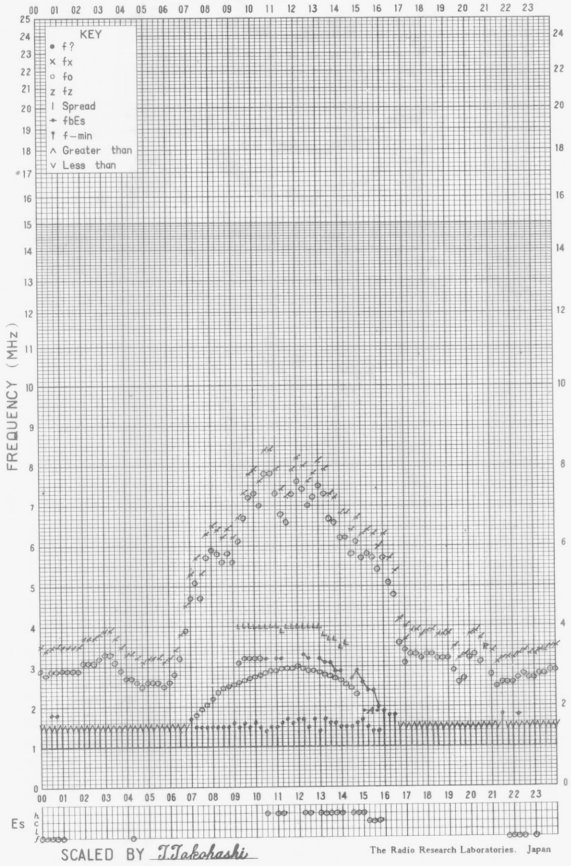

SCALED BY T Takahashi

The Radio Research Laboratories. Japan

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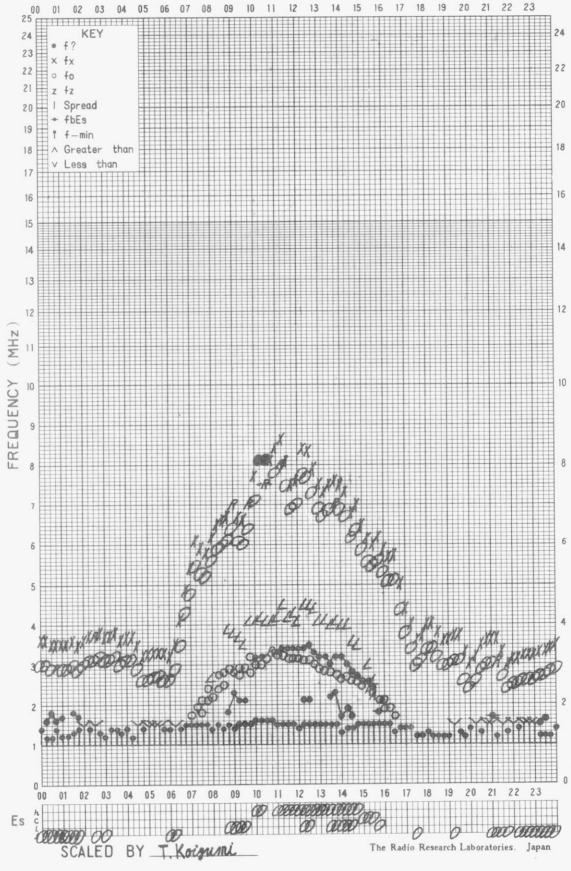

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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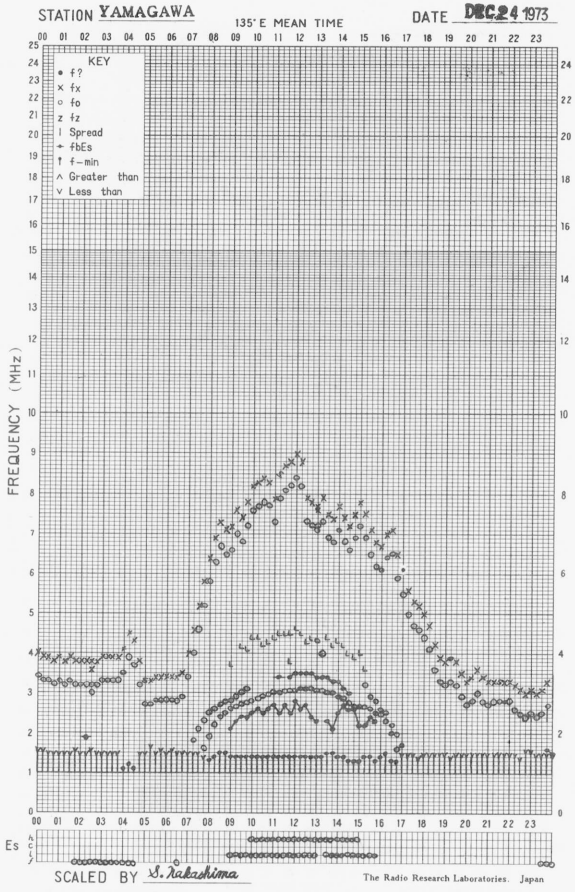

SCALED BY S. Takashima

The Radio Research Laboratories. Japan

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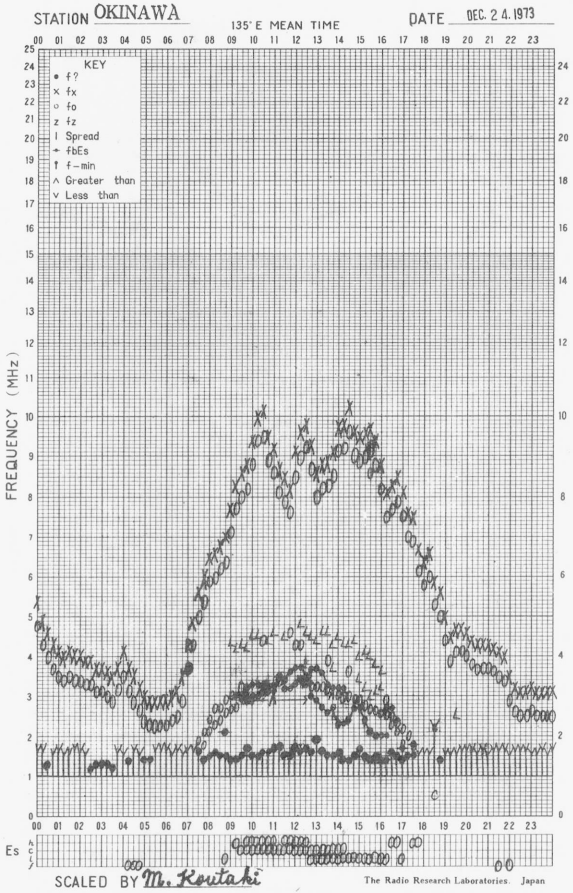

SCALED BY M. Kowtaki

The Radio Research Laboratories. Japan

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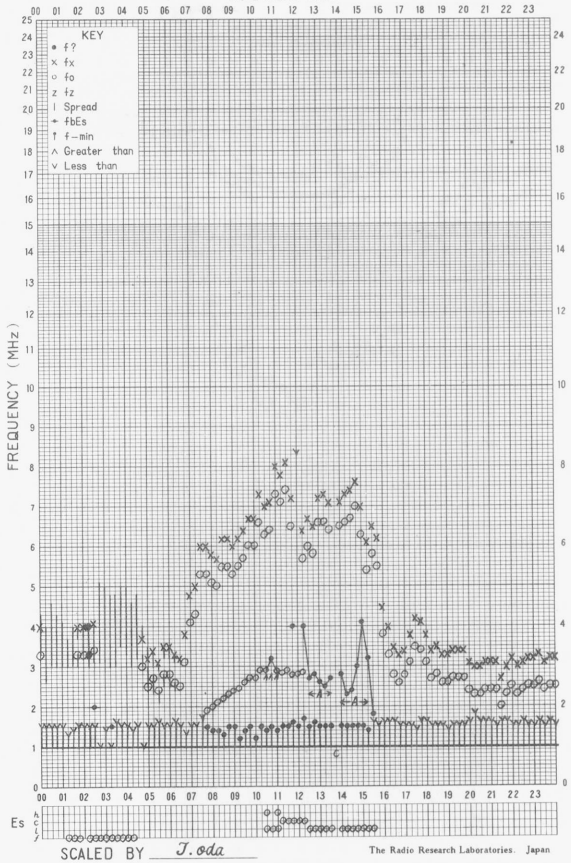

SCALED BY T. oda

The Radio Research Laboratories. Japan

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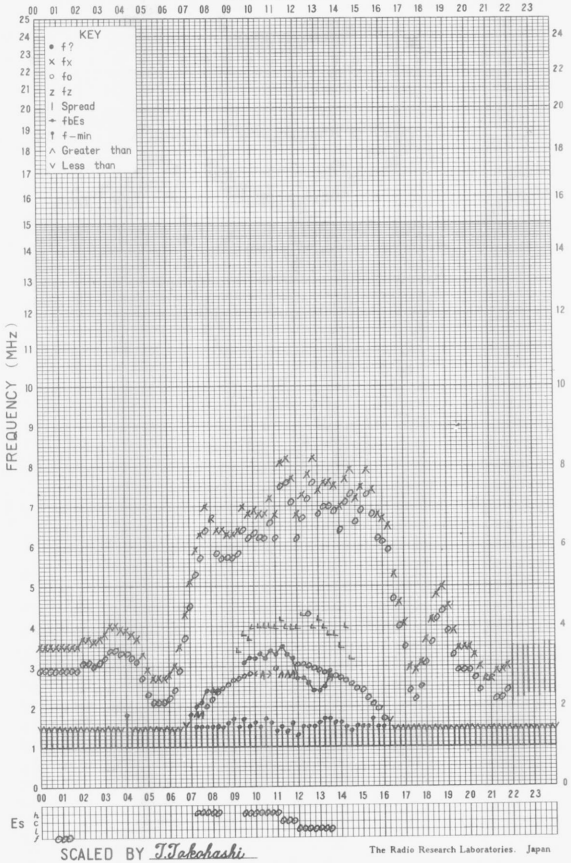

SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

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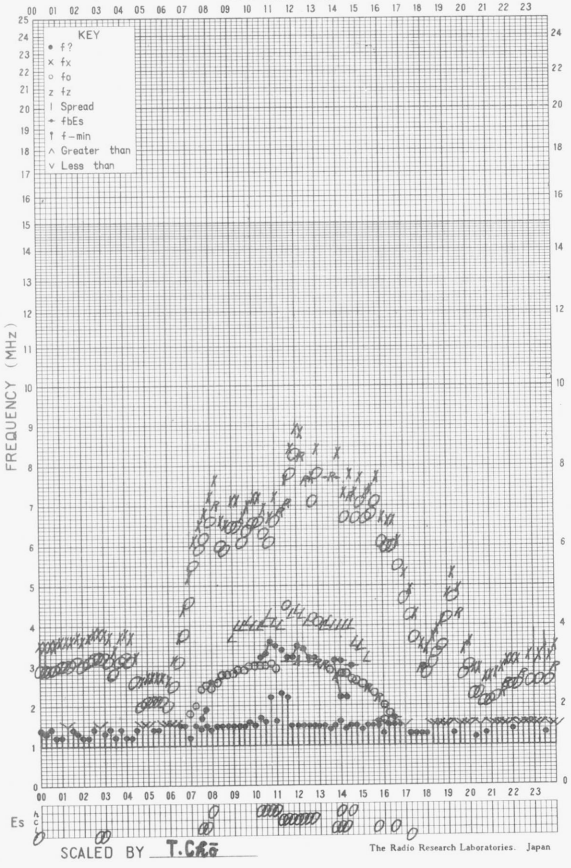
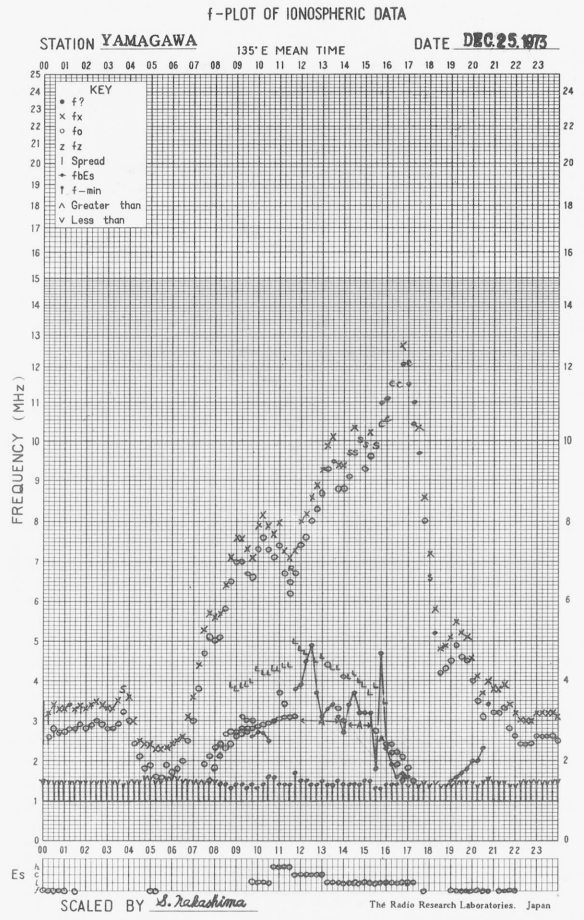


SCALED BY T. Ogo

The Radio Research Laboratories. Japan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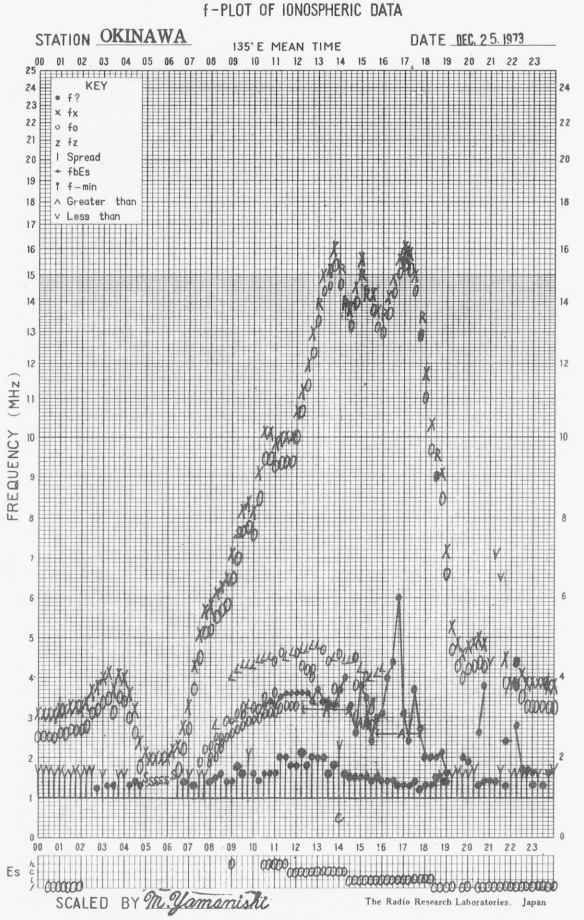
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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SCALED BY M. Yamanishi
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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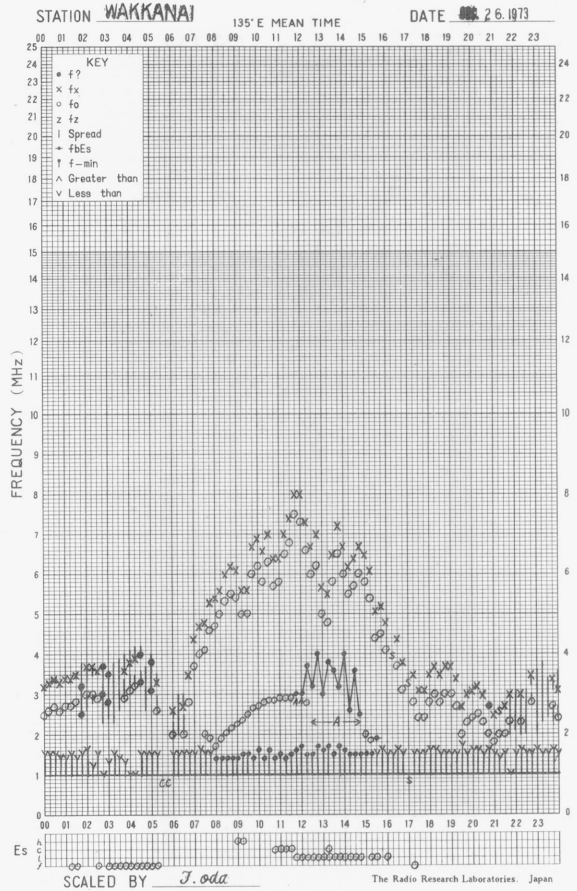

SCALED BY T. oda

The Radio Research Laboratories. Japan

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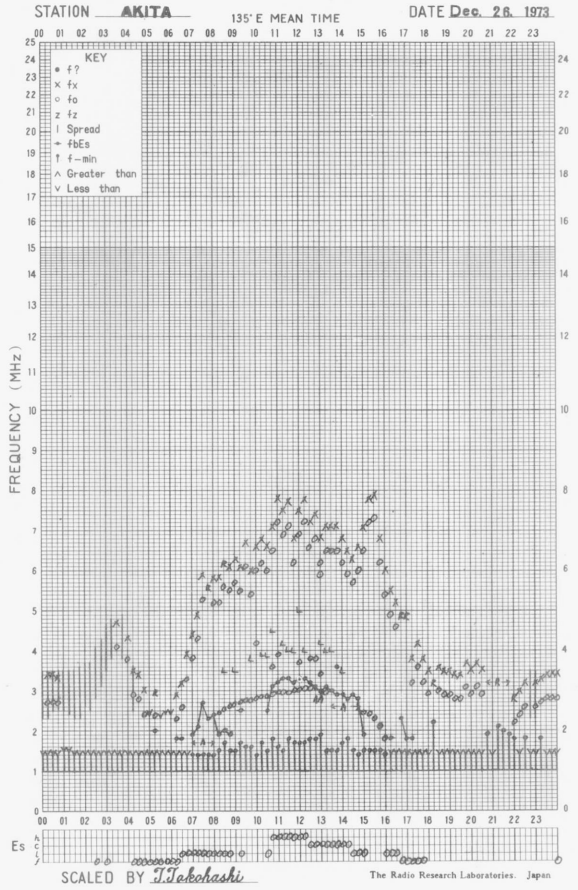
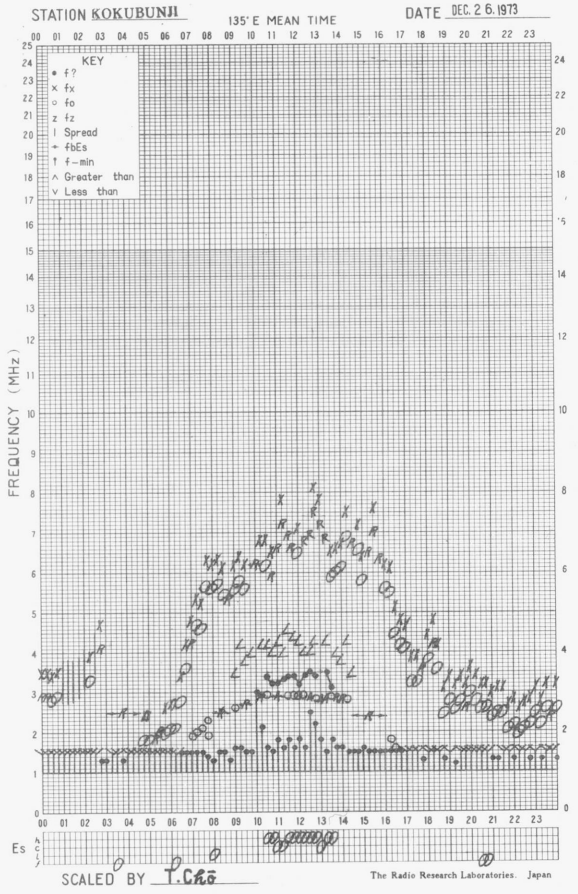


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

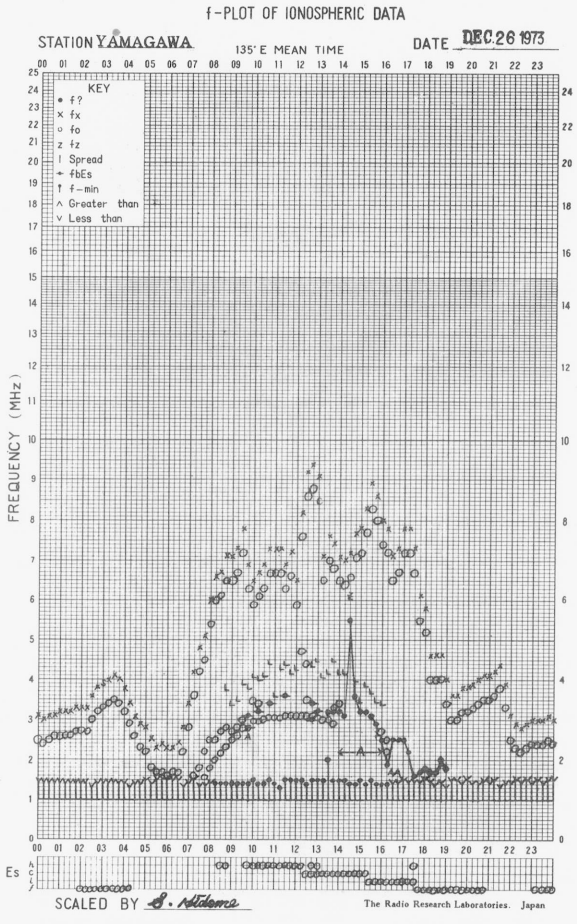
f-PLOT OF IONOSPHERIC DATA

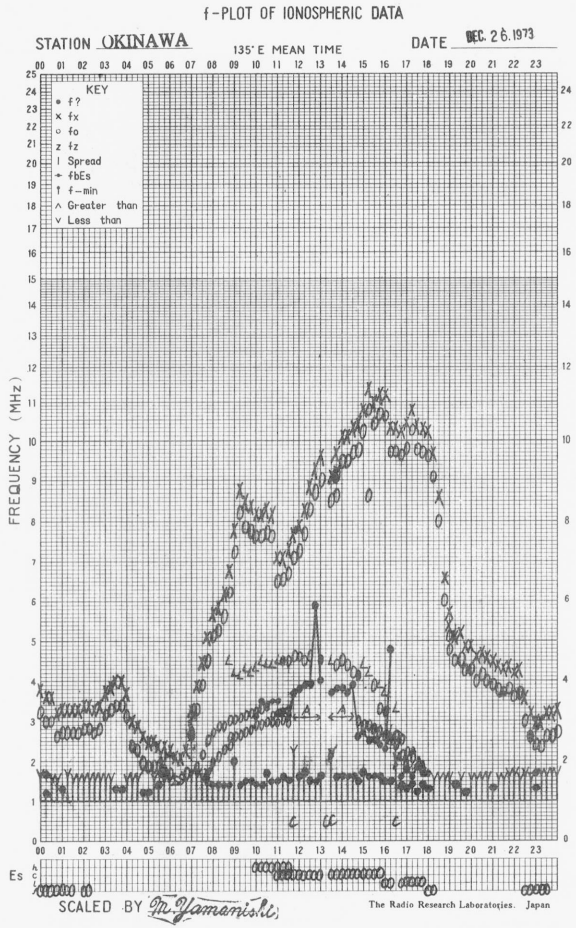
STATION KOKUBUNJI 135°E MEAN TIME DATE DEC. 2 6. 1973



SCALED BY T. Chō

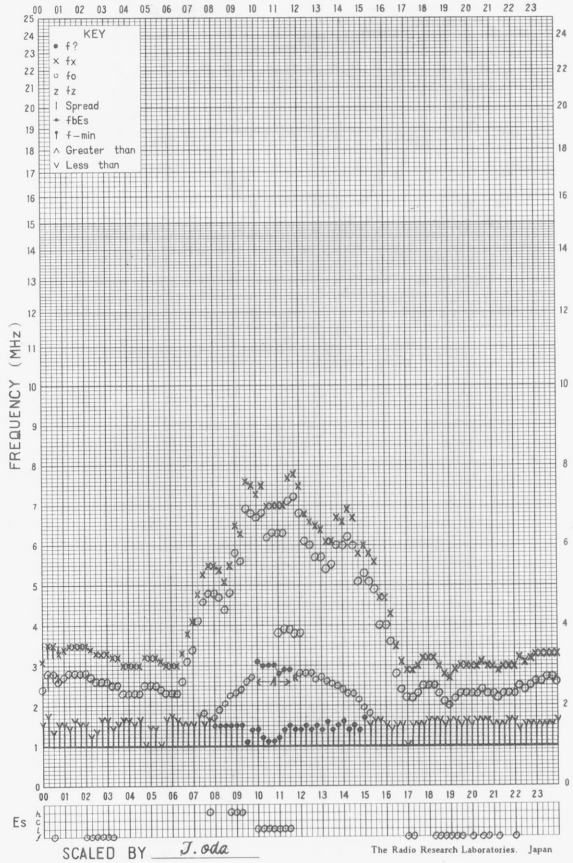
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE DEC.26 1973
KEY
• f?
× fx
○ fo
z fz
! Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY S. Ishikawa
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION OKINAWA
135° E MEAN TIME
DATE DEC. 26.1973
KEY
• f?
× fx
○ fo
z fz
! Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY M. Yamanishi
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE Dec. 27. 1973

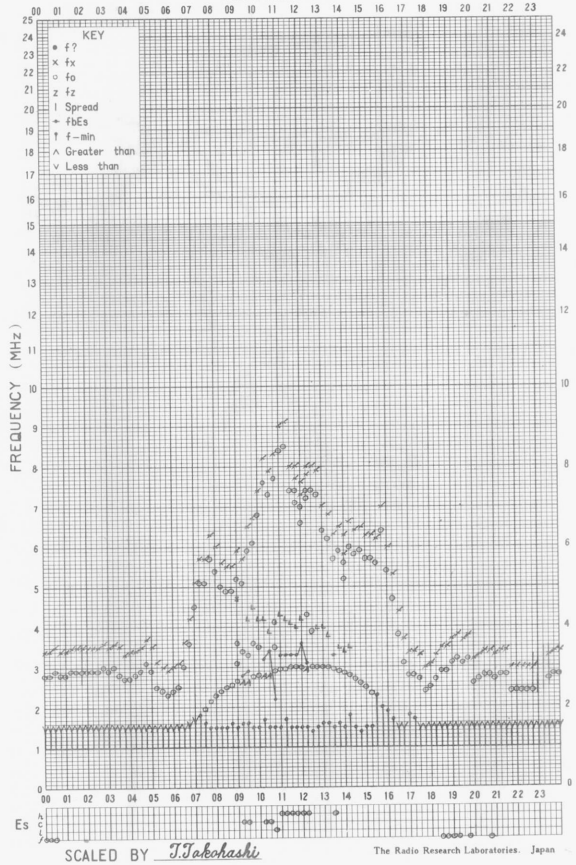


SCALED BY J. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE Dec. 27. 1973

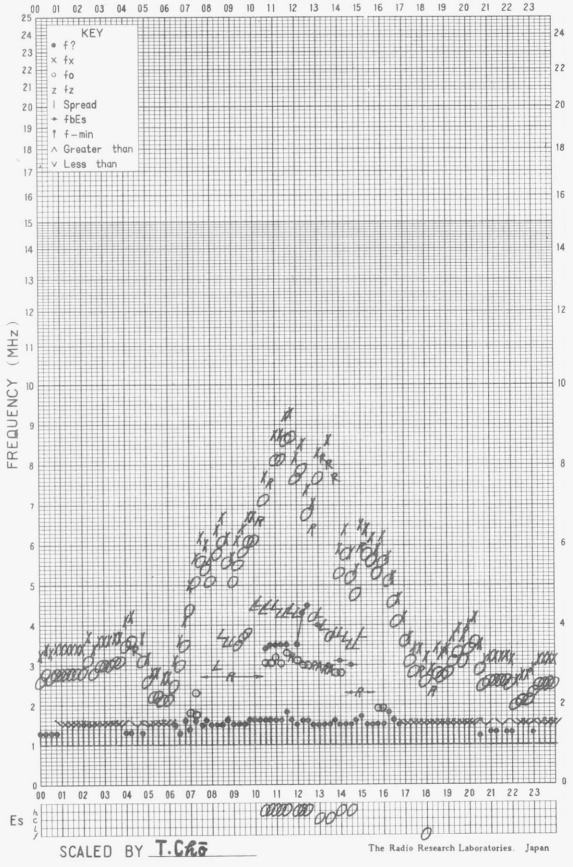


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135° E MEAN TIME DATE DEC. 27. 1973

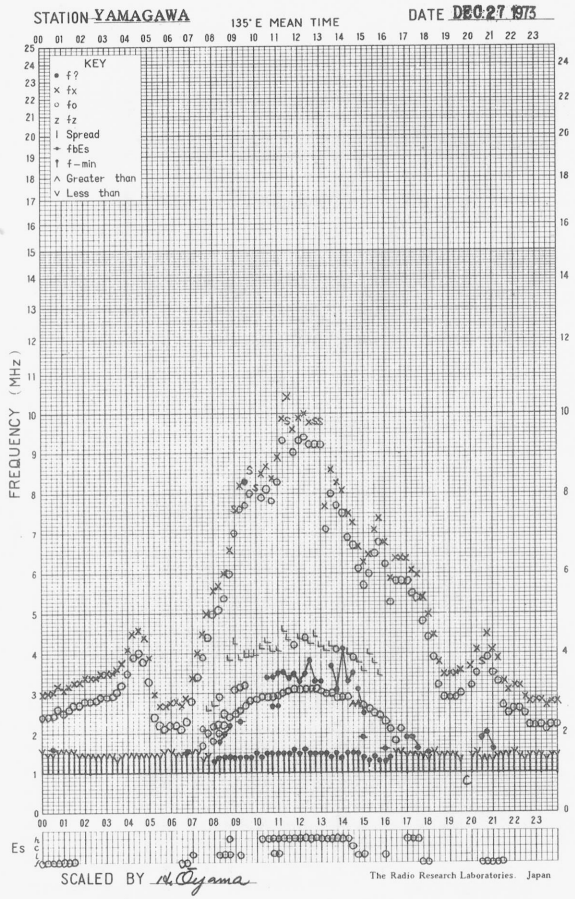


SCALED BY T. Cho

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE DEC 27 1973



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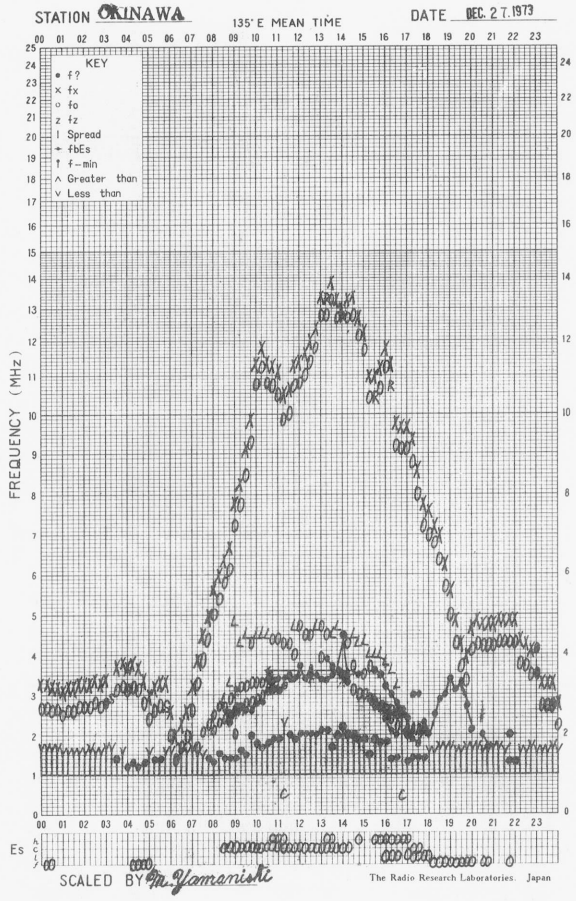
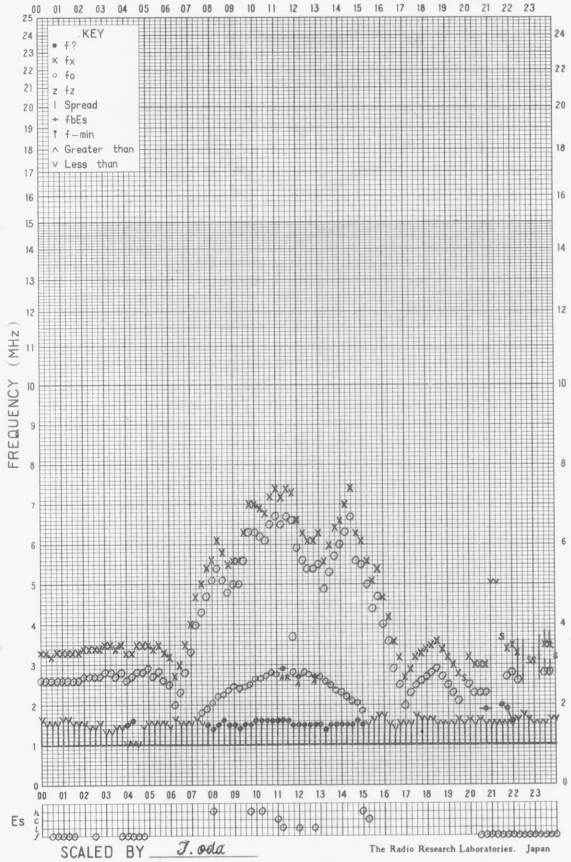


f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC. 2 8. 1973

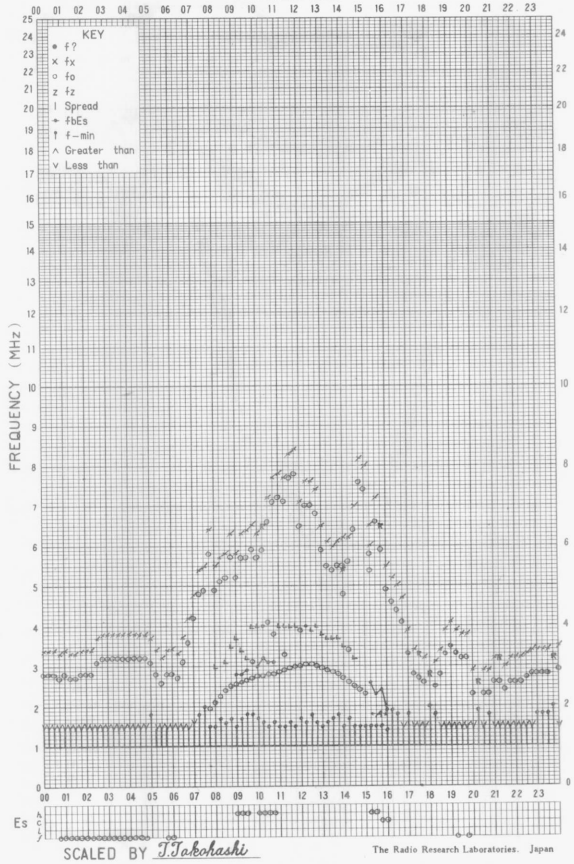


SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Dec. 28. 1973

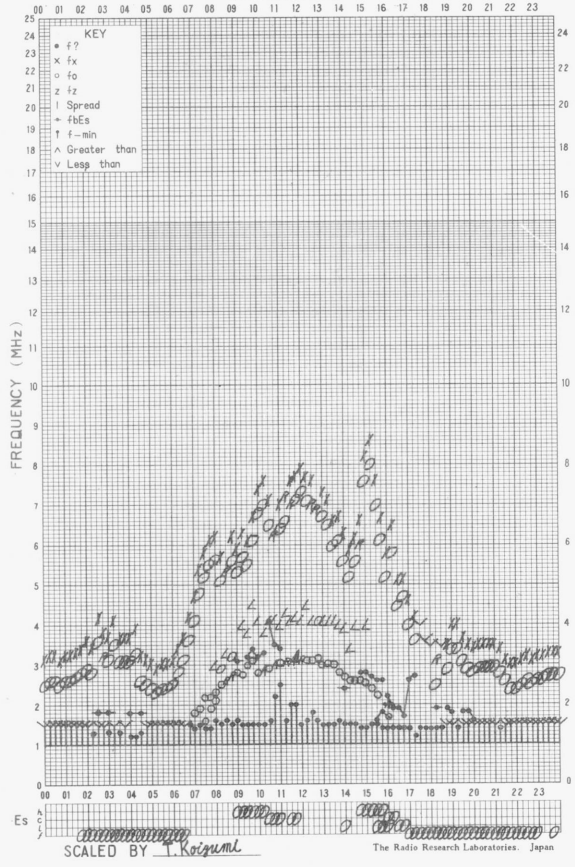


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE DEC. 2 8. 1973

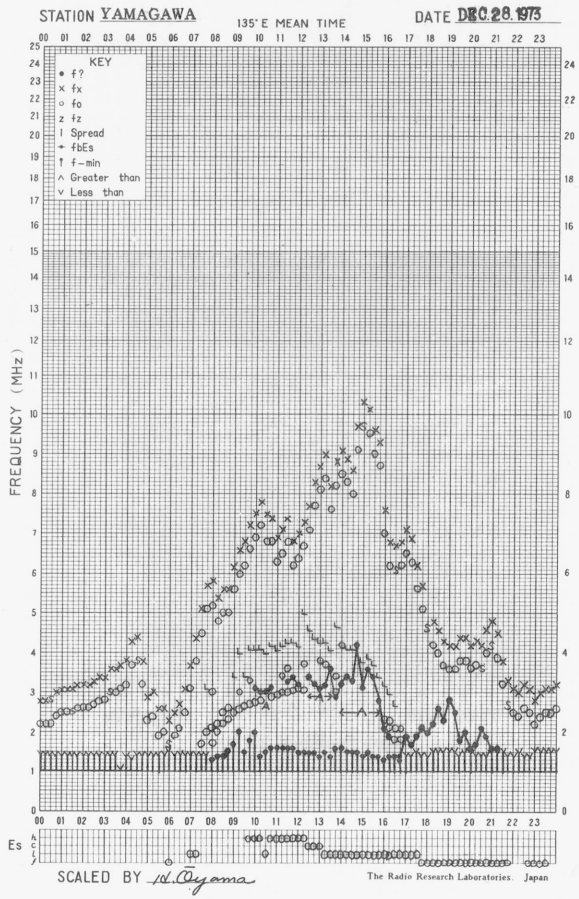


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE DEC. 28. 1973

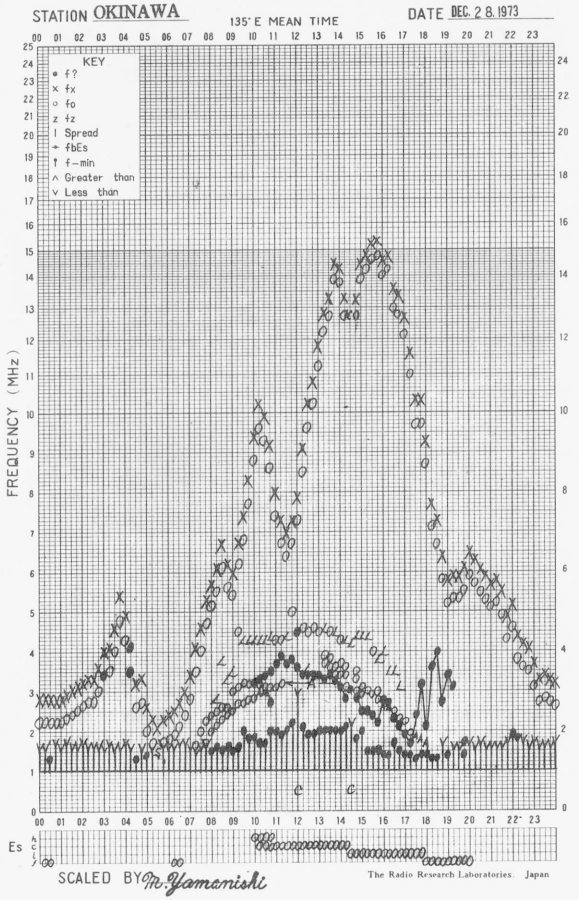


SCALED BY H. Ōyama

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION OKINAWA 135°E MEAN TIME DATE DEC. 28. 1973

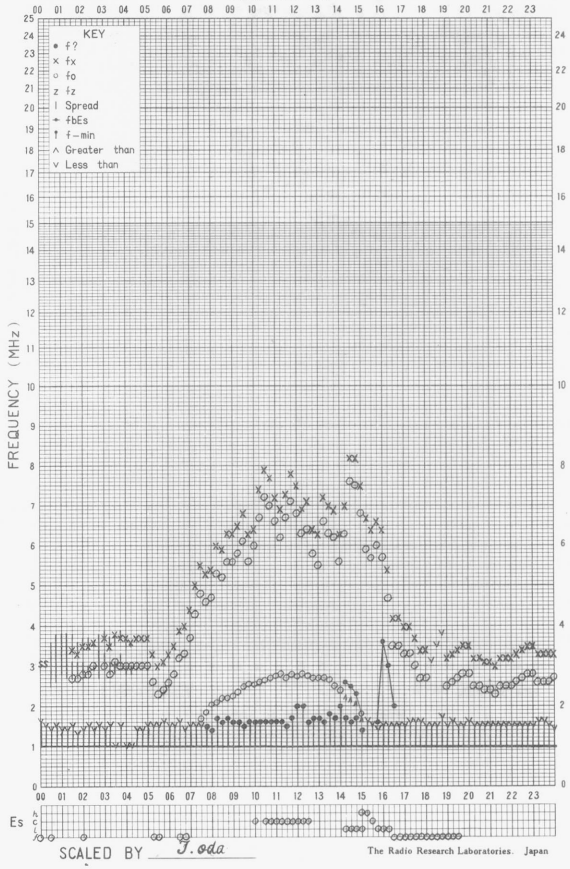


SCALED BY R. Yamanishi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE DEC 2 9 1973

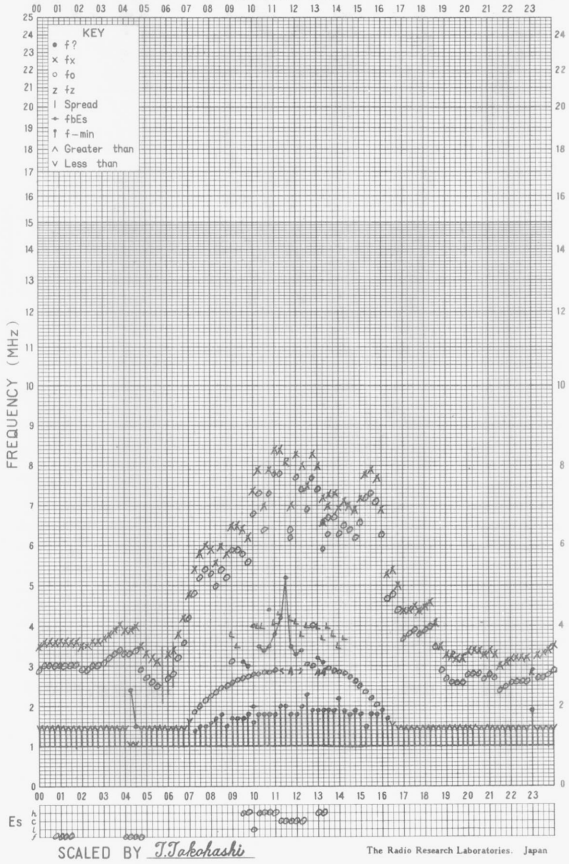


SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE Dec. 29. 1973

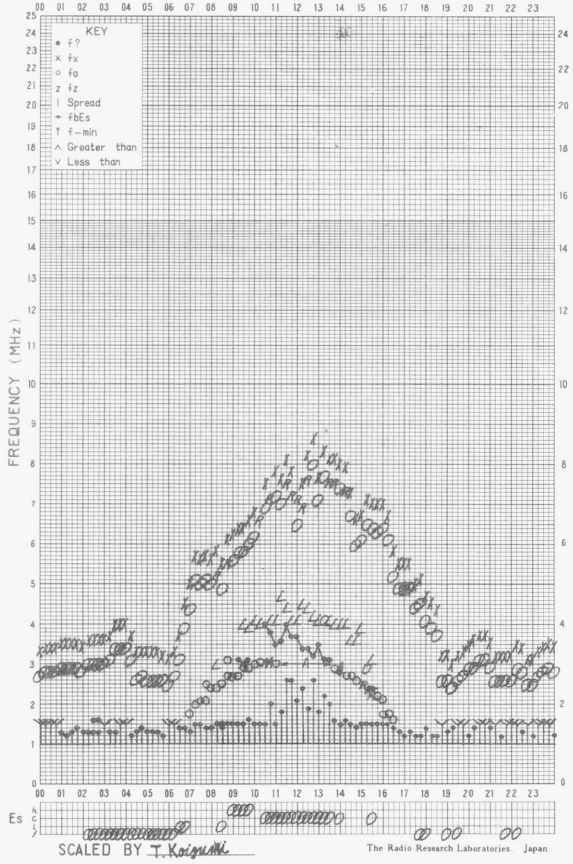


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

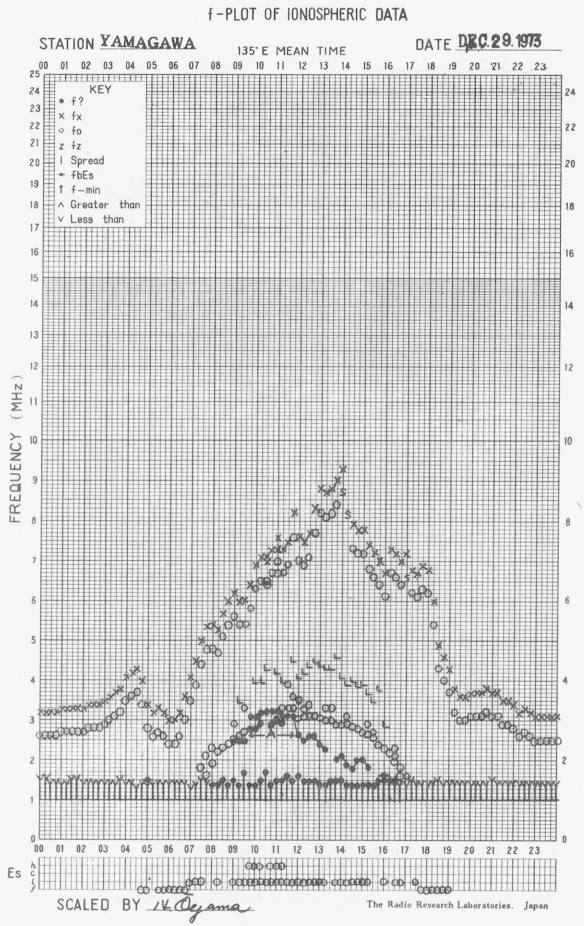
f-PLOT OF IONOSPHERIC DATA

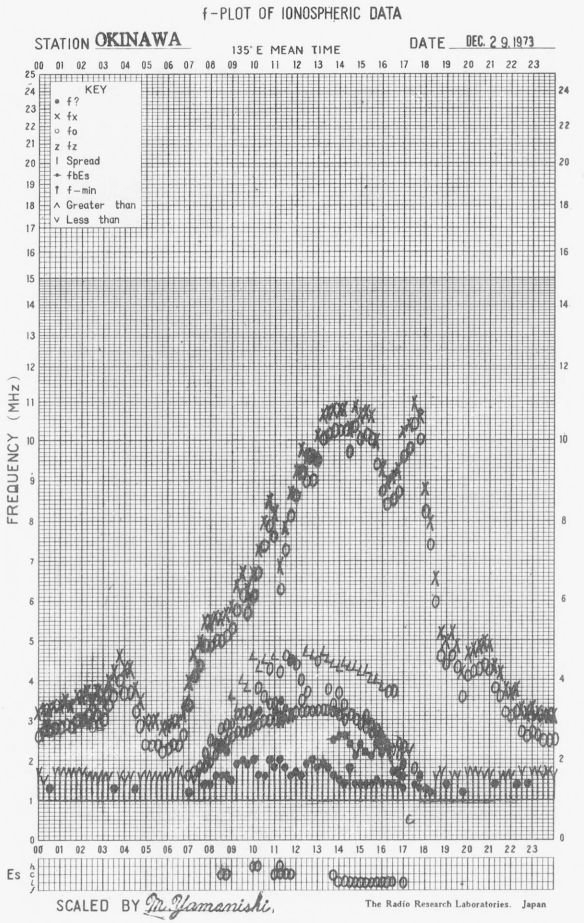
STATION KOKUBUNJI 135° E MEAN TIME DATE DEC. 2 9 1973



SCALED BY T. Koizumi

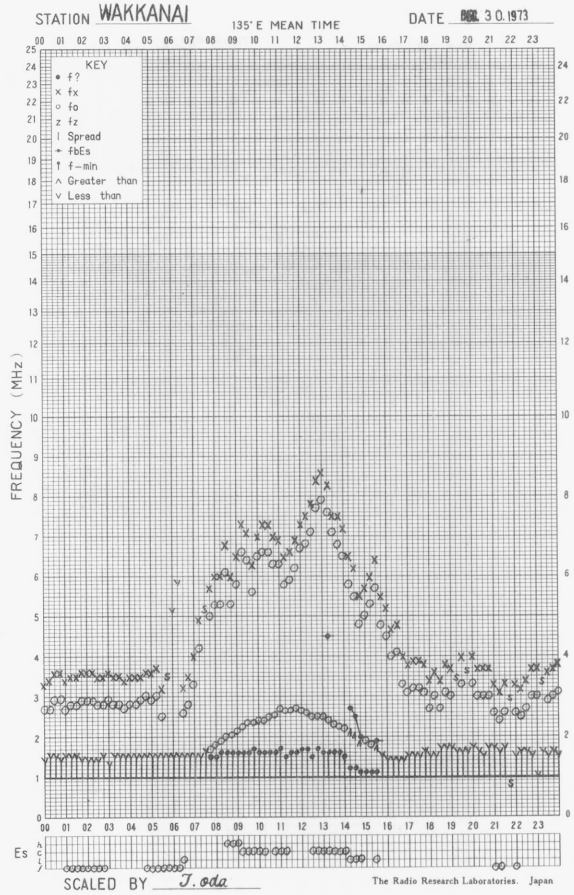
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE DEC.29.1973
KEY
* f?
× fx
○ fo
z fz
I Spread
← fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY K. Ogama
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION OKINAWA
135°E MEAN TIME
DATE DEC. 29.1973
KEY
* f?
× fx
○ fo
z fz
I Spread
← fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Yamanishi
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC. 30.1973

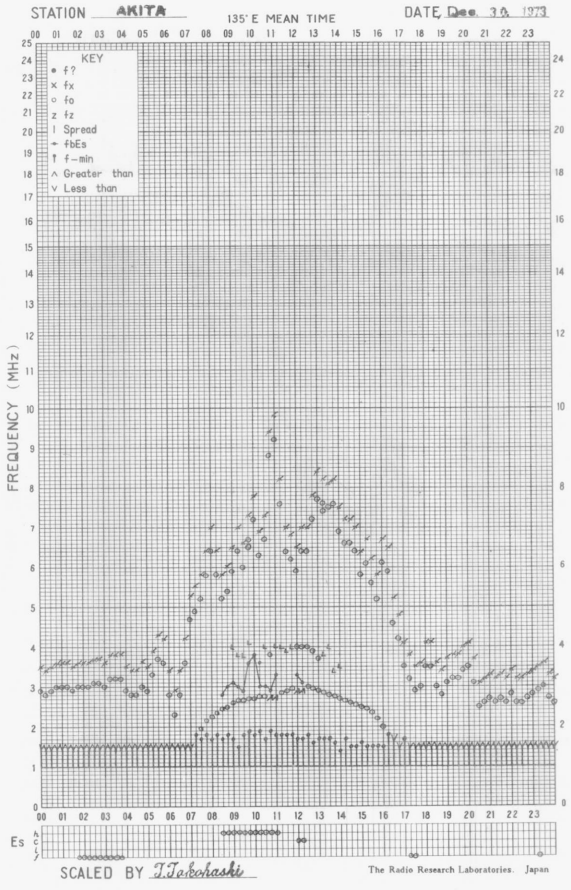


SCALED BY J. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Dec. 30. 1973

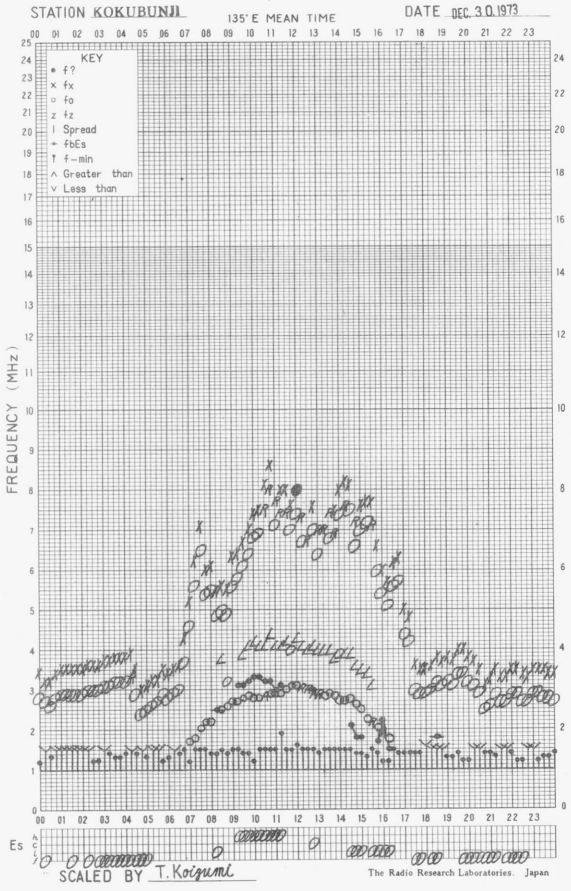


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

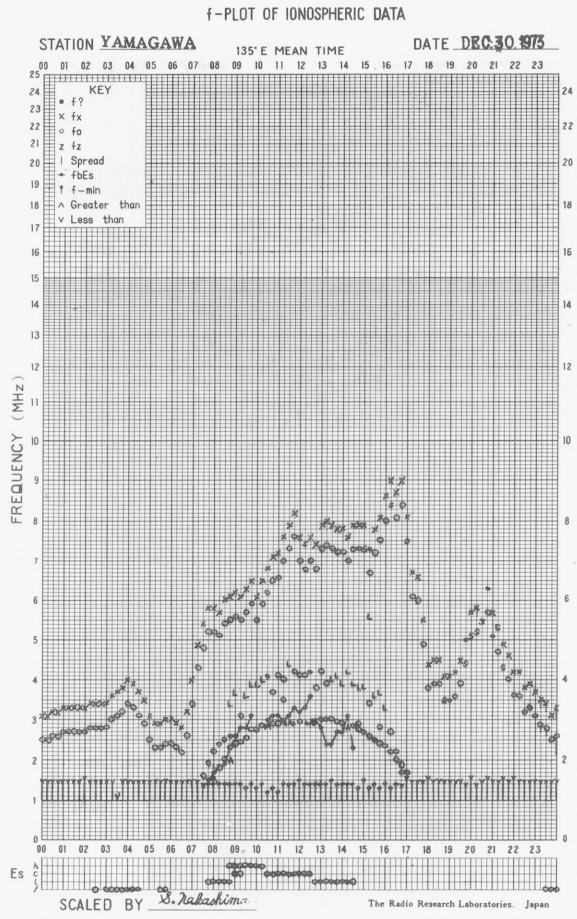
f-PLOT OF IONOSPHERIC DATA

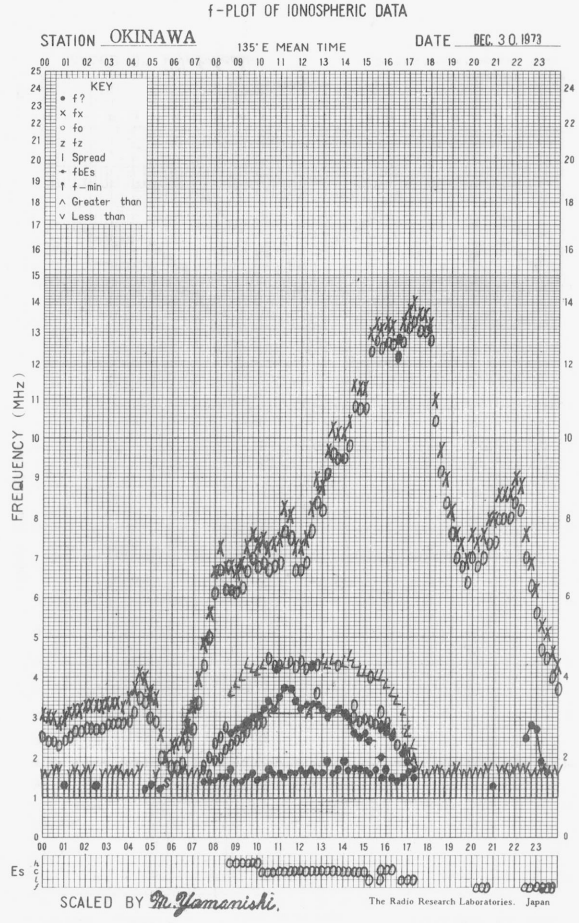
STATION KOKUBUNJI 135°E MEAN TIME DATE DEC. 30.1973



SCALED BY T. Koizumi

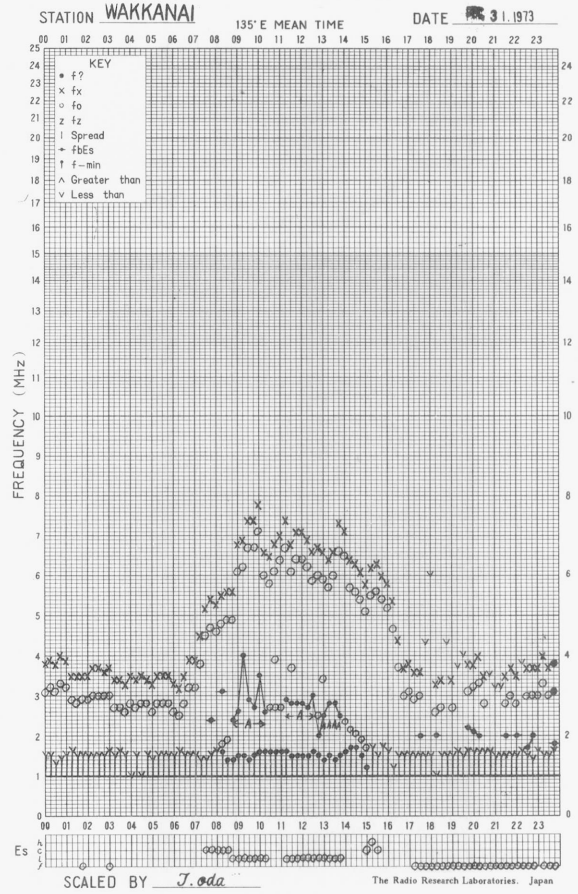
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE DEC.30.1973
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION OKINAWA
135° E MEAN TIME
DATE DEC. 30 1973
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY M. Yamanishi
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC 31. 1973

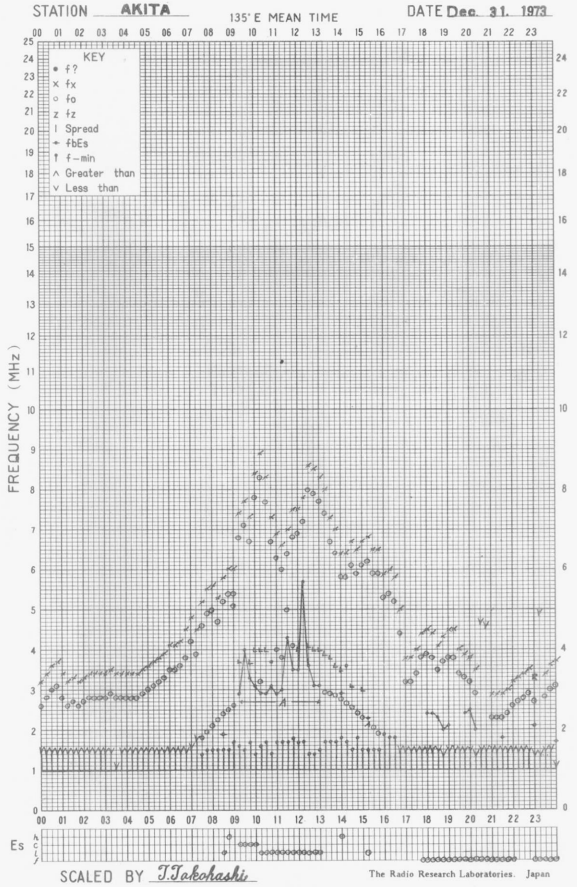


SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Dec. 31. 1973

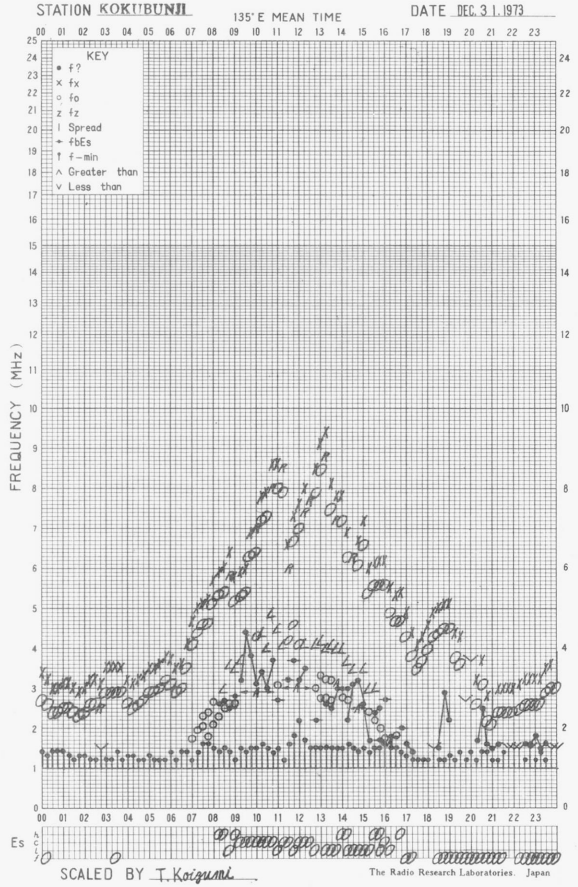


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE DEC. 31. 1973

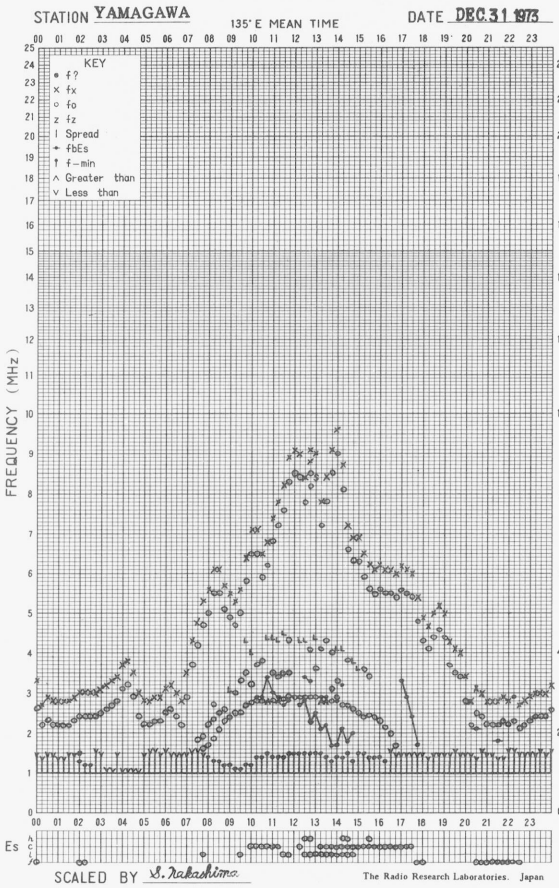


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE DEC. 31 1973

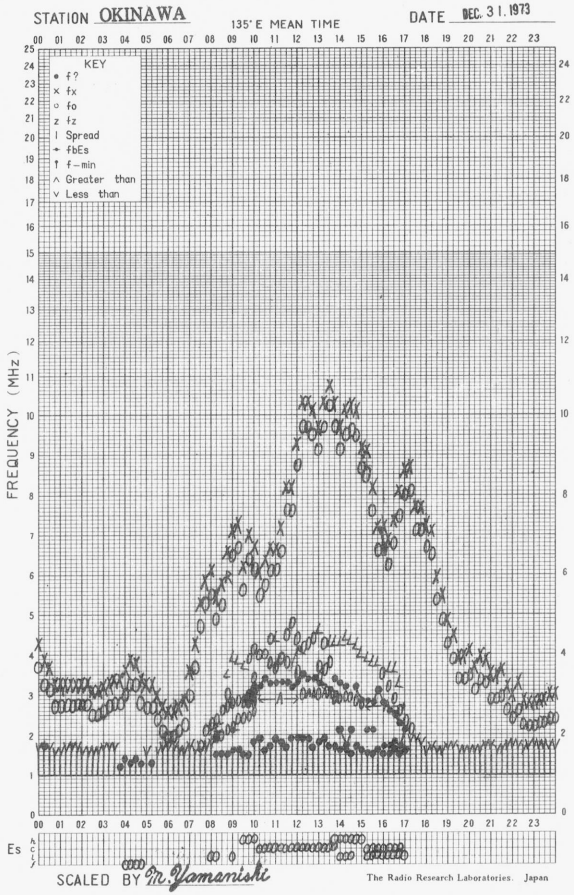


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION OKINAWA 135°E MEAN TIME DATE DEC. 31. 1973



SCALED BY M. Yamanishi

The Radio Research Laboratories. Japan

SOLAR RADIO EMISSION

Flux Density and Variability

Month: December 1973
Observing station: Hiraiso
Frequency: 200 MHz

	Flux density 10^{-22} Wm^{-2} 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	10	10	(10)	9	10	0	0	(0)	0	0
2	9	9	(8)	9	9	0	0	(0)	0	0
3	(9)	-	-	-	(9)	(0)	-	-	-	(0)
4	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-
6	9	9	(9)	9	9	0	0	(0)	0	0
7	9	9	(9)	9	9	0	0	(0)	0	0
8	9	9	(9)	9	9	0	0	(0)	0	0
9	9	9	(9)	9	9	0	0	(0)	0	0
10	9	9	(9)	9	9	0	0	(0)	0	0
11	9	9	(9)	9	9	0	0	(0)	0	0
12	9	9	(9)	10	9	0	0	(0)	0	0
13	10	10	(10)	10	10	*	0	(0)	0	0
14	10	10	(10)	10	10	0	0	(0)	0	0
15	10	10	(10)	10	10	0	0	(0)	0	0
16	11	11	(10)	11	11	0	0	(0)	0	0
17	11	11	(11)	11	11	0	0	(0)	0	0
18	12	12	(12)	12	12	0	0	(0)	0	0
19	12	12	(12)	12	12	0	0	(0)	0	0
20	13	13	(12)	13	13	0	0	(0)	0	0
21	13	12	(13)	13	13	0	1	(0)	1	0
22	13	13	(13)	12	13	1	0	(0)	0	0
23	13	14	(14)	13	13	0	1	(1)	1	0
24	14	44	(24)	42	25	1	3	(2)	3	2
25	41	20	(15)	12	31	3	2	(1)	0	2
26	12	13	(14)	13	12	1	1	(1)	1	1
27	13	12	(12)	12	12	1	1	(1)	1	1
28	12	12	(12)	11	12	0	0	(0)	0	0
29	11	11	(11)	10	11	0	0	(*)	0	0
30	10	10	(11)	10	10	0	0	(0)	0	0
31	10	10	(10)	9	10	0	0	(0)	0	0

Note No observations during the following periods:

3rd 0015- 5th 2400
27th 0200- 0220

*: interference.

SOLAR RADIO EMISSION

Flux Density

Month: December 1973
Observing station: Hiraiso Frequency: 500 MHz

Flux density 10^{-22} Wm^{-2} Hz^{-1}

UT	00-03	03-06	06-09	21-24	Day
Date					
1	23	23	(24)	(23)	23
2	23	23	(22)	(23)	23
3	23	23	(22)	(23)	23
4	23	23	(23)	(23)	23
5	24	24	(24)	(24)	24
6	25	25	(24)	(25)	25
7	26	24	(25)	(23)	25
8	24	24	(22)	(22)	23
9	23	23	(22)	(26)	23
10	24	24	(23)	(23)	24
11	24	24	(24)	(24)	24
12	25	26	(26)	(24)	25
13	26	26	(25)	(26)	26
14	26	24	(24)	(24)	25
15	24	23	(23)	(24)	24
16	25	23	(24)	(24)	24
17	26	26	(24)	(25)	25
18	26	26	(27)	(27)	26
19	28	27	(26)	(27)	27
20	29	28	(26)	(27)	28
21	27	27	(29)	(28)	27
22	29	29	(29)	(30)	29
23	29	31	(34)	(27)	30
24	29	33	(30)	(34)	30
25	34	30	(29)	(26)	32
26	27	28	(28)	(26)	28
27	26	26	(26)	(24)	26
28	24	24	(23)	(23)	24
29	24	24	(22)	(22)	23
30	22	23	(23)	(21)	23
31	22	22	(22)	(21)	22

Distinctive Events

(single-frequency observations)

Month: December 1973
Observing station: Hiraiso
Normal observing period: 2140 - 0730 (sunrise to sunset)

Date	Freq.	Starting time	Time of maximum	Duration	Type	Flux density 10^{-22} Wm^{-2} Hz^{-1}		Polarization	Remarks
	MHz	UT	UT	minutes		peak	mean		
19	100	0654.0	0655.5	2.0	C	650	130		
21	100	0448.5	0451.3	3.5	C	110	30		
23	100	2331.9	2332.9	3.0	C	1000D	200D		
	200	2332.0	2332.7	2.5	C	160	50		
24	200	0248	0435	342D	ns	40	25		*
		2140E	0033	650D	ns	70	30		*
25	100	0134.4	0134.6	1.0	C	750	120		
		0238.0	0238.4	1.0	C	400	100		

*: Flux duplicates in steady flux.

No polarization measurement: 1st 0000 - 31st 2400.

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

DEC 1973 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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

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

DEC 1973 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Dec. 1973	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Conditions 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start	End	Range
1	4o	4U S S 4	4 S S 4	N N N N			
2	4o	S S S 4	4 S S 4	N N N N			
3	4o	4U S S 4	4 4U S 4	N N N N			
4	4o	S S S 4	4 S S 4	N N N N			
5	4+	S S 5U 4	4 4U S 4	N N N N			
6	4o	4U S S 4	4 S S 4	N N N N			
7	4o	5U S S 3U	4 S S 4	N N N N			
8	4o	4U S S 4	4 S S 4	N N N N			
9	4o	S S S 4	4 S S 4	N N N N			
10	4-	4U S S 4	3 S S 4	N N N N			
11	4o	S S S 4	4 S S 4	N N N N			
12	4-	S S S 3	4 S S 4	N N N N			
13	4-	S S S 3U	4 S S 4	N N N N			
14	4-	S S S 3U	4 S S 4	N N N N			
15	4-	S S S 3U	4 S S 4	N N N N			
16	3+	S S S 3U	4 S S 3	N N N N			
17	4o	S S S 4	4 S S 4	N N N N			
18	4+	5U S S 4	4 S S 4	N N N N			
19	4o	4U S S 4	4 S S 4	N N N N			
20	4+	5U S S 4U	4 S S 4	N N N N			
21	4+	5U S S 4U	4 S S 4	N N N N			
22	4+	5U S S 4	4 S S 4	U U U U			
23	4-	4U S S 3	4 S S 4	N N N N			
24	4o	S S S 4	4 S S 4	N N N N			
25	4-	S S S 4U	4 S S 3	N N N N			
26	4-	S S S 3U	4 S S 4	N N N N			
27	4-	S S S 4	4 S S 3	N N N N			
28	4-	4U S S 4	4 S S 3	N N N N			
29	4-	S S S 4	4 S S 3	N N N N			
30	4o	S S S 4	4 S S 4	N N N N			
31	4-	S S S 4U	4 S S 3	N N N N			

SUDDEN IONOSPHERIC DISTURBANCES

HIRAISO

Time in U.T.

Dec. 1973	S W F						Correspondence		
	Drop-out Intensities (dB)			Start	Duration	Type	Imp.	Solar Flare	Solar Noise	Geomag. Crochet
	CO	HA	1) 2)							
2	15	8		0159	37	Slow	1+		×	

NOTES

CO: Colorado (WWV)
HA: Hawaii (WWVH)
1): Australia
2): Teheran

I N U B O

Dec. 1973	S P A									Remarks
	Phase Advance (degrees)						Time (U.T.)			
Date	GBR	NAA	NWC	NPG	ND3	AL3	Start	End	Maximum	
2		—	50	23		15	0154	0341	0214	X
2			9				0352	0505	0400	
3			8				0118	0140	0122	
3			11				0340	0444	0342	
16			9				0429	0524	0446	
16			18				0554	0706	0603	
16			10				2353	0024	0002	
17		13	30	17	21	12	0039	0146	0044	X
21	—	27	35				0415	0545	0427	X
28				13	34		0126	0233	0138	

IONOSPHERIC DATA IN JAPAN FOR DECEMBER 1973
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