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# IONOSPHERIC DATA IN JAPAN

FOR NOVEMBER 1960

Vol. 12 No. 11

(Including Provisional Data at Showa Base)

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Prepared by

THE RADIO RESEARCH LABORATORIES  
MINISTRY OF POSTS AND TELECOMMUNICATIONS  
KOKUBUNJI, TOKYO, JAPAN

# IONOSPHERIC DATA IN JAPAN

FOR NOVEMBER 1960

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THE RADIO RESEARCH LABORATORIES

KOKUBUNJI, TOKYO, JAPAN

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## SITES OF THE RADIO WAVE OBSERVATORIES

Ionospheric observation is carried out at the following four observatories in Japan.

	Latitude	Longitude	Site
Wakkanai	45°23.6'N.	141°41.1'E.	Wakkanai-shi, Hokkaido
Akita	39°43.5'N.	140°03.2'E.	Tegata Nishishin-machi, Akita-shi, Akita-ken
Kokubunji	35°42.4'N.	139°29.3'E.	Koganei-machi, Kitatama-gun, Tokyo-to
Yamagawa	31°12.5'N.	130°37.7'E.	Yamagawa-machi, Ibusuki-gun, Kagoshima-ken

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

	Latitude	Longitude	Site
Hiraiso	36°22.0'N.	140°37.5'E.	Hiraiso-machi, Nakaminato-shi, Ibaragi-ken

## SYMBOLS AND TERMINOLOGY

### A. IONOSPHERE

All symbols and terminology in the table of ionospheric data are used in accordance with the First Report of the Special Committee on World-Wide Ionospheric Soundings (URSI/AGI), Brussels, September 2, 1956, and the Second Report of the Committee, May, 1957, supplementary to the First Report.

#### Terminology

$f_0F2$	The ordinary-wave critical frequency for the $F2$ , $F1$ and $E$ layers respectively.
$f_0F1$	
$f_0E$	
$f_0E_s$	The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.
$f_bE_s$	The ordinary wave frequency at which the highest blanketing $E_s$ layer becomes effectively transparent. This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.
$f$ -min	That frequency below which no echoes are observed.
(M3000) $F2$	The maximum usable frequency factor for a path of 3000 km for transmission by $F2$ layer.
(M3000) $F1$	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.

- $h'E_s$  The lowest virtual height of the trace used to give the  $f_0E_s$ .
- $h_pF2$  The virtual height of the  $F2$  layer measured on the ordinary-wave branch at a frequency equal to  $0.834 f_0F2$
- $y_pF2$  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  $h_pF2$  and the virtual height at  $0.969 f_0F2$ ).

**a. Descriptive Symbols**

Used following the numerical value on monthly tabulation sheets.

- A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example  $E_s$ .
- B Measurement influenced by, or impossible because of, absorption in the vicinity of  $f$ -min.
- C Measurement influenced by, or impossible because of, any non-ionospheric reason.
- D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range. 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 is too small compared with that of a lower thick layer.
- H Measurement influenced by, or impossible because of, the presence of a stratification
- L Measurement influenced by or impossible because the trace has no sufficiently definite cusp between layers.
- M Measurement questionable because the ordinary and extraordinary components are not distinguishable.
- N Conditions are such that the measurement cannot readily be interpreted, for example, in the presence of oblique echoes.
- O Measurement refers to the ordinary component.
- R Measurement influenced by, or impossible because of, absorption in the vicinity of a critical frequency.
- S Measurement influenced by, or impossible because of, interference or atmospheric.
- 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.

**b. Qualifying Symbols**

Used as a preceding symbol on monthly tabulation sheets.

D	<i>greater than.....</i>
E	<i>less than.....</i>
I	Missing value has been replaced by an interpolated value.
J	Ordinary component characteristic deduced from the extraordinary component.
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U'	Uncertain or doubtful numerical value.
Z	Measurement deduced from the third magnetoionic component.

**c. Description of Standard Types of  $E_s$**

The nine standard types of  $E_s$  are identified by small (lower case) letters: *l, c, h, q, r, a, s, f, n*. These letters are suggestive of the names low, cusp, high, equatorial, retardation, auroral, slant, flat and unclassified, respectively; it is strongly emphasized that these names are suggestive, not restrictive. The standard types are:

- l*      A flat  $E_s$  trace at or below the normal  $E$  layer minimum virtual height. Use in daytime only.
- c*      An  $E_s$  trace showing a relatively symmetrical cusp at or below  $f_0E$ . This is usually continuous with the normal  $E$  trace though, when the deviative absorption is large, part or all of the cusp may be missing. Use in daytime only.
- h*      An  $E_s$  trace showing a discontinuity *in height* with the normal  $E$  layer trace at or above  $f_0E$ . The cusp is not symmetrical, the low frequency end of the  $E_s$  trace lying clearly above the high frequency end of the normal  $E$  trace. Use in daytime only.
- q*      An  $E_s$  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  $E_s$  trace which is non-blanketing over part or all of its frequency range showing an increase in virtual height at the high frequency end similar to group retardation. This is distinguished at present from true group retardation (a blanketing thick layer included in the  $E$  layer tables:  $f_0E, h'E$ ) by the lack of group retardation in the  $F$  traces at corresponding frequencies.
- a*      An  $E_s$  pattern having a well defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. These sometimes exceed over several hundred kilometers of virtual height.
- s*      A diffuse  $E_s$  trace which rises steadily with frequency. This usually emerges from another  $E_s$  trace which should be classified separately. At high latitudes the slant trace usually starts to rise from a horizontal  $E_s$  trace, *l, h* or *f*, and frequencies which greatly exceed the  $E$  layer critical frequency (e.g. about 6 Mc/s) whereas at low latitudes it usually rises from equatorial type  $E_s, q$ , at frequencies near the  $E$  region critical frequency.
- f*      An  $E_s$  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  $E_s$  traces observed in the daytime are classified according to their virtual height:  $h$  or  $L$ .

" An  $E$  trace which cannot be classified into one of the standard types. This must not be used for intermediate cases between any two classes. A choice should always be made whenever possible, even if it is doubtful.

**d. Multiple Reflections from  $E_s$**

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

## B. SOLAR RADIO EMISSION

Solar radio emission is received on 200 Mc at Hiraiso Radio Wave Observatory using a  $6 \times 4$  dipole broadside array and an ordinary superheterodyne receiver. The type of observation is of intensity recording of both steady flux and outstanding occurrences.

**a. Daily Data**

*Steady flux*

The mean value of recorded base level. Outstanding occurrences are to be omitted except the phenomena with duration of hours or more.

*Variability*

Variability is expressed in four grades as follows:

0=no burst

1=a few bursts

2=many bursts

3=exceptionally many bursts

Number of bursts is determined relatively in comparison with the base level. If the number of bursts be fixed, the variability is greater, when bursts are widely distributed, than in the case of being concentrated in a short period.

**b. Outstanding occurrences**

*Starting time*

When the start is not obvious, 20% rise time of smoothed flux is adopted and  $x$  is suffixed. (e.g. 0234 $x$ )

*Maximum time*

When the instantaneous maximum can not be taken, the smoothed maximum is used and  $x$  is suffixed. (e.g. 0539 $x$ )

*Time of end*

When the phenomena have ended obscurely the time of 20% of maximum smoothed flux is written.

*Type*

Outstanding emissions are classified as follows: On another point of view, the classification in the URSI Interchange code is to be added.

S: simple rise and fall of intensity

C: complex variation of intensity

A: appears to be part of general activity

D: distinct from (i.e. apparently superposed upon) the general

activity

M: multiple peaks separated by relatively long period of quietness

F: multiple peaks separated by relatively short period of quietness

E: sudden commencement or rise of activity

Combined letters express one phenomenon (e.g. SD, ECD); letters joined by + express some phenomena occurring in parallel; the preceding term is more important (e.g. SD+F, SA+C).

*Maximum intensity*

Instantaneous: The highest value above the base level.

Smoothed: By multiplying the duration, the approximate total power of the phenomenon can be estimated.

### C. RADIO PROPAGATION CONDITIONS

#### a. Radio Propagation Quality Figures

Radio propagation quality figures are usually expressed on the scale that ranges from one to five as follows:

1 = good

4 = poor (disturbed)

2 = normal

5 = very poor (very disturbed)

3 = rather poor (unstable)

The tabulated circuits contain London (Commercial circuit), WWV (frequencies 10, 15, 20 Mc broadcast from Washington, D.C.), San Francisco (commercial circuit) and WWVH (frequencies 10, 15 Mc broadcast from Hawaii), which are received at Hiraiso Radio Wave Observatory near Tokyo.

Warnings of radio propagation broadcast from JJY station are expressed in three grades:

N = normal

U = unstable

W = disturbed

The letter W expresses disturbed condition expected to be during the following 12 hours after issue. The letter U and N means also unstable or normal conditions, respectively.

Whole day radio quality indices are the weighted averages of the 6-hourly indices of London, WWV and S.F., with half weight given to quality grade 2 (normal). This procedure is taken to avoid the concentration of the whole day indices to grade 2.

Start- and end-time of principal geomagnetic storms closely correlated to radio propagation conditions are tabulated from observations at Kakioka.

#### b. Sudden Ionospheric Disturbances (S. I. D.)

The data of short wave fade-out (SWF) are prepared from the field intensity records on following circuits received at Hiraiso. Characteristics of the phenomenon are classified as follows.

*Circuits and Drop-out intensity*

- WS.....WWV 20 Mc, 15 Mc and 10 Mc (Washington)
- S F.....WMA-25: 5.0775 Mc, WMA-47: 7.485 Mc, WMF-27A2: 7.712  
3 Mc WMH-30A2: 10.3873 Mc, WMH-53A2: 13.7773 Mc and  
WMJ-30A2: 20.8173 Mc (San Francisco)
- HA.....WWVH 15 Mc and 10 Mc (Hawaii)
- TO.....JJY 15 Mc and 10 Mc (Tokyo)
- LN.....GIJ-27: 7.6975 Mc, GIJ 30: 10.9075 Mc, GBJ 34: 14.798 Mc and  
GIJ-38: 18.4375 Mc (London)

Start-time and Duration, Types and Importances are described from the data of a circuit whose Drop-out Intensity is underlined. Drop-out Intensities of 10 Mc, 15 Mc and 20 Mc for WWV, WWVH and JJY are marked; 10 Mc ('), 15 Mc (none) and 20 Mc (").

*Start-times and Durations*

*Types*

- S : sudden drop-out and gradual recovery
- Slow: slow drop-out taking 5 to 15 minutes and gradual recovery
- G : gradual disturbances; fade irregular in both drop-out and recovery

*Importances*

Degrees of SWF are classified into 9 grades according to the amplitude of fade-out;

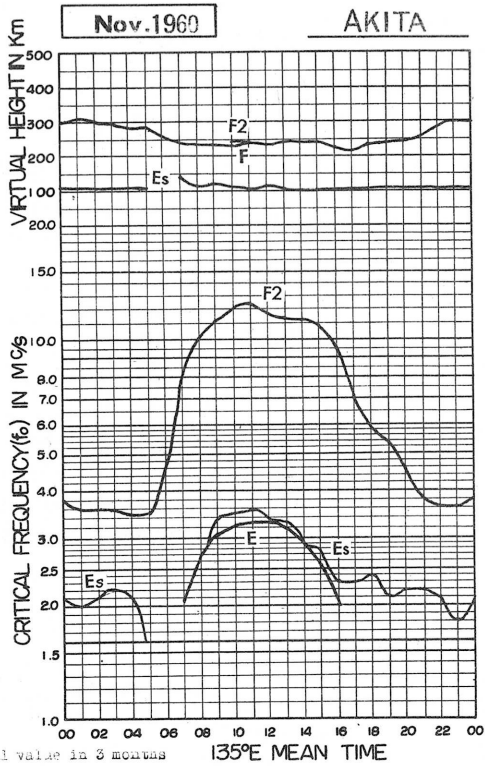
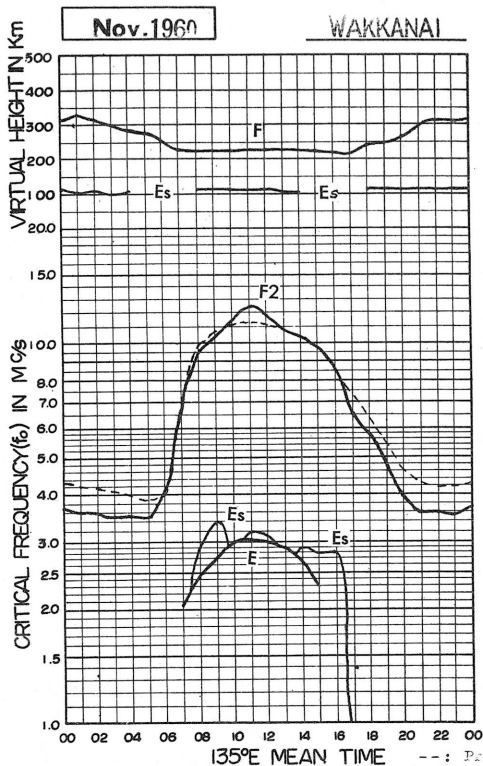
1-	1	1+
2-	2	2+
3-	3	3+

The data of sudden enhancement of atmospheric (SEA) observed on 28 kc are tabulated on each *Start-time, Duration and Importance*.

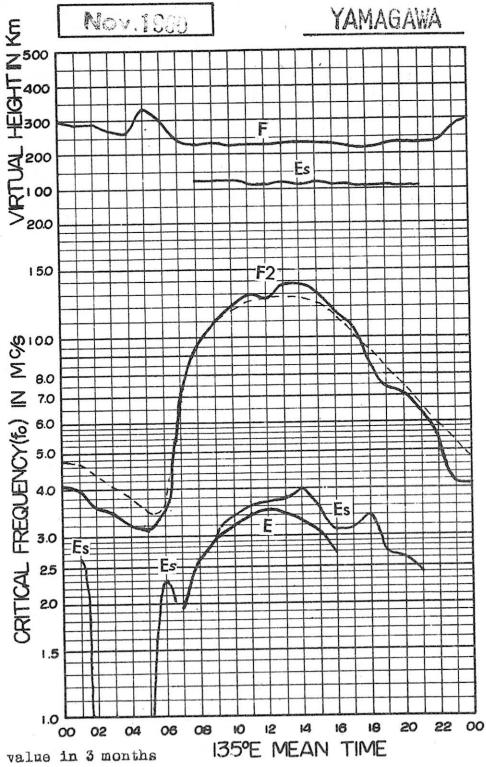
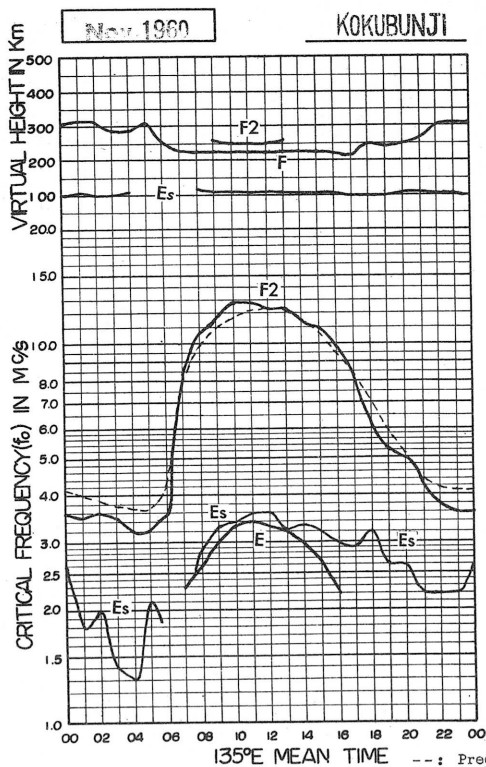
Besides, the time associated phenomena of SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record) are given in this table from interchange messages or measurements at Hiraiso.



IONOSPHERIC DATA  
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA  
MONTHLY MEDIAN CHARACTERISTICS



# IONOSPHERIC DATA

Lat. 45° 23.6' N  
Long. 141° 41.1' E

## Wakkanai

135° E Mean Time (GMT.+9h.)

foF2

Nov. 1960

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	U3P A	3.7	3.8	3.7 F	3.5	3.5 F	4.2	U78S	8.8	U108R	10.7	11.1	10.8	J108R	10.7	9.5	10.3	6.2	4.7	5.2	4.0	3.8	4.1	4.0	
2	4.2	3.9	3.7	3.8	3.8	4.0	4.5	8.2	10.8	11.7	11.1	12.8	12.6	J108R	10.6	10.3	9.5	7.5	5.8	5.8	4.9	3.7	4.0	4.0	
3	4.0	4.3	4.5	3.2	3.4	3.2	4.4	7.5	10.5	12.3	12.8	12.1	10.5	U108R	10.6	11.6	9.4	6.0	6.0	5.8	4.9	5.0	4.7	4.8	
4	5.0	4.8	4.1	4.3	4.0	3.7	5.0	8.0	9.8	10.8	11.3	12.3	12.1	U108R	10.5	12.3	U107R	8.5	7.0	7.0	5.9	5.7	6.5	5.8	
5	5.8	4.9	4.7	4.5	4.8	4.3	5.8	3.1	U108R	11.3	12.2	12.9	13.0	11.6	10.5	10.1	9.5	8.7	5.8	5.4	4.9	4.8	4.8	3.8	
6	3.8	3.6	3.9	4.1	3.8	3.5	5.0	9.4	I24.5	12.6	12.4	12.7	12.7	U108R	11.3	10.6	9.6	6.2	5.8	5.3	5.0	4.6	4.0	3.5	
7	3.7 F	3.7	3.7	3.5	3.3	3.0	4.9	9.8.5	11.7	12.7	11.8	12.3	11.7	11.5	11.6	U105R	9.7	7.0	5.9	5.6	4.9	4.0	4.0	3.8 FS	
8	4.2	4.2	4.0	4.2	4.0	3.3	4.4	5.8.4	10.0	10.8	11.7	13.0	12.5	11.8	10.3	9.5	8.2	7.5	6.0	4.8	4.7	3.6	3.4	3.4	
9	3.5	3.6	3.6	3.7	3.8	3.6	4.5	9.8.3	9.5	10.3	11.6	13.0	11.8	11.4	12.0	10.8	8.0	7.1	5.8	5.4	4.3	3.6	3.7	3.8	
10	4.0	3.7	4.0	4.2	3.6	3.5	4.5	8.3	9.8	10.8	11.1	11.8	11.8	U108R	10.5	9.8	8.8	6.5	5.7	4.9	4.2	3.6	3.5	3.8	
11	4.0	4.1	4.0	4.3	3.9	3.8	4.5	8.0	U11.1	12.4	12.5	12.7	11.8	I2.1	12.5	11.8	10.0	8.0	6.8	6.4	5.0	4.3	4.3	4.7	
12	5.0	3.3	3.5	3.5	3.5	3.5	4.5	7.0	12.5	11.3	12.2	12.5	12.5	12.0	11.7	10.5	9.7	8.0	5.8	4.5	4.0	3.5	3.5	3.5	
13	3.6	3.3	3.5	3.3	3.5	3.6	6.2	7.0	U10.7	12.3	11.3	11.8	11.8	10.3	10.3	9.6	9.4	8.5	7.0	5.8	F	F	FS	FS	
14	3.5	3.5 F	3.5 F	3.1 A	3.2 F	A	3.5 F	6.8	R	10.1	11.3	R	10.4	I10.7	10.3	10.3	8.1	6.8	5.8	5.3 F	F	FS	F	4.2 F	
15	4.1 F	F	F	F	F	F	3.5 F	6.1	U103	9.6	9.7	11.6	B	R	10.3	10.0	8.3	5.3	4.6	4.7	A	3.3	3.7	2.8 F	
16	2.7 F	2.8 F	2.7	2.4 F	2.4 F	2.8 F	3.5	6.3	U105	9.3	12.0	12.2	U13.8	R	12.0	U106	9.3	7.5	7.4	7.6	6.8	6.7	7.2	4.8	
17	4.0	4.1	4.1	4.1	4.3 F	3.6	3.5	6.4	9.7	R	12.5	12.4	11.3	11.0	10.3	9.6	8.5	7.0	6.5	5.0	4.0	3.4	3.5	3.4 F	
18	3.7 F	F	F	F	3.7 F	3.7	4.1	6.2	9.7	10.0	U108	12.7	11.6	10.8	10.0	9.7	7.6	6.5	4.6	3.6	3.4	3.1	3.4	3.3	
19	3.4	3.5	3.5	3.6	3.5	3.5	4.1	6.8	9.9	10.6	U108	11.3	11.6	10.7	10.0	9.8	8.2	6.5	5.2	4.1	3.2	2.7	3.1	3.2	
20	3.3	3.3	3.3	3.4	3.4	3.5	3.5	6.5	9.3	10.1	R	12.2	11.7	U108	10.0	8.2	7.8	6.8	4.9	3.5	3.7	3.7	3.8	3.8	
21	4.0	4.1	4.2	4.5	4.1	4.1	4.3	8.1	9.4	10.7	12.1	12.3	11.5	10.1	9.1	9.6	9.0	6.1	7.1	5.9	3.2	3.2	3.2	3.0	
22	3.0	3.0	2.6	2.7	2.6	2.5	2.7	4.4	5.5	6.5	6.5	7.7	7.7	8.2	8.4	8.3	6.8	4.8	4.1	4.0	3.9	3.5	3.6	3.1	
23	3.3	3.3	3.3 F	3.4	F	FS	6.8	6.8	9.6	9.8	12.0	12.6	11.3	10.3	10.3	9.8	6.6	4.5	4.8	4.6	3.9	3.5	3.7	3.8	
24	3.8	4.0	3.8	3.7	3.8	3.6	3.8	7.5	I2.2	9.7	10.7	12.3	11.8	9.7	10.3	9.7	6.0	5.7	4.8	4.7	4.0	3.4	3.7	3.1 A	
25	3.1	3.2	3.3	3.2	3.2	3.3	3.3	6.5	9.3	10.4	R	11.9	11.8	10.3	8.3	8.8	7.5	7.8	4.8	3.5	3.0	3.2	3.7	3.5	
26	3.6	3.3 H	3.4	2.6	2.6	2.6	2.6	6.8	9.6	R	R	R	U105	10.3	10.3	9.8	8.3	5.1	3.6	3.1	2.7	2.6	2.9	2.9	
27	3.0	2.8	3.1	3.1	2.8	2.8	2.8	6.6	C	C	C	C	C	C	C	8.8	9.8	6.3	5.6	4.3	3.0	2.7	2.9	2.9	
28	3.2 F	3.1	3.2	3.2	3.3	3.0 F	3.2	6.6	9.3	10.3	12.6	12.3	11.8	10.8	9.6	8.2	7.1	5.9	4.3	4.3	2.9	2.8	3.0	3.2	
29	3.3	3.4	3.4	3.3	3.3	3.1	3.2	6.8	9.5	10.5	U108	10.3	8.7	9.8	8.9	8.1	6.7	5.2	4.3	3.7	3.0	3.0 F	3.2	3.2	
30	3.4 F	3.5	3.4 F	3.4	3.5	3.0	3.5	6.8	9.2	I2.6	10.1	11.9	11.6	9.0	8.2	7.3	2.0	6.3	3.8	3.5	2.9	2.9	3.0	3.2	
31																									
No.	2.7	2.8	2.8	2.8	2.8	2.7	2.9	3.0	2.8	2.6	2.6	2.8	2.7	2.9	3.0	3.0	3.0	3.0	3.0	3.0	2.7	2.8	2.8	2.9	
Median	3.7	3.6	3.6	3.5	3.5	3.5	4.1	4.8	9.6	10.5	11.6	12.3	11.8	10.7	10.3	9.8	8.6	6.5	5.8	4.8	4.0	3.6	3.6	3.5	
UQ	4.0	4.0	4.0	4.1	3.8	3.6	4.5	8.2	10.4	11.3	12.2	12.7	12.2	11.4	11.2	10.6	9.5	7.5	6.0	5.6	4.9	4.0	4.0	3.9	
LQ	3.3	3.3	3.3	3.2	3.2	3.0	3.4	6.4	9.3	10.0	10.8	11.3	10.7	10.3	10.0	8.8	7.8	5.9	4.7	4.1	3.2	3.2	3.3	3.2	
QR	0.7	1.7	0.7	0.9	0.6	0.6	1.1	1.8	1.1	1.3	1.4	1.4	1.5	1.1	1.2	1.8	1.7	1.6	1.3	1.5	1.7	0.8	0.7	0.7	

Sweep 1.0 Mc to 2.2 Mc in  $\frac{1}{\text{min}}$  sec in automatic operation.

The Radio Research Laboratories, Japan.

foF2

W 1

# IONOSPHERIC DATA

Lat. 45° 23.6' N  
 Long. 141° 41.1' E

**Wakkanai**

135° E Mean Time (GMT. + 9h.)

foF1

Nov. 1960

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										L														
6											L													
7																								
8																								
9																								
10																								
11																								
12																								
13										L		L												
14																								
15										L	L	LH												
16																								
17																								
18																								
19																								
20																								
21										4.0	F4.1	L	L											
22																								
23																								
24																								
25																								
26																								
27									C	C	C	C	C	C	C									
28												L												
29																								
30																								
31																								
No.																								
Median	/ / 4.0 4.1																							

Sweep 1.0 Mc to 22.7 Mc in 1 min 1 sec in automatic operation.

foF1

The Radio Research Laboratories, Japan.

Lat. 45° 23.6' N  
Long. 141° 41.1' E

Wakkanai

IONOSPHERIC DATA

135° E Mean Time (GMT.+9h.)

foE

Nov. 1960

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	Z <sub>65</sub> <sup>S</sup> 275	275	300	300	310	300	260	230	S							
2							S	S	250	285	300	300	300	290	290	A	A							
3								200	260	285	305	305	305	305	275	225	S							
4								215	260	285	305	300	300	300	280	245	S							
5		S	E	E	E	S	S	210	250	275	300	290	290	290	240	S								
6								R	A	A	300	315	330	310	290	255	S							
7								205	245	270	305	325	310	300	295	A	A							
8								A	R	295	300	320	295	295	A	A	A							
9								S	260	290	300	305	300	280	275	A	A							
10								S	S	285	310	305	315	300	280	S	A							
11								S	265	285	330	340	325	310	285	S	S							
12								R	A	275	300	320	310	300	A	A	A							
13								210	250	270	300	310	300	290	245	210	S	S	S	S			170	
14								295	235	260	290	290	300	280	265	235	A							
15								200	260	290	300	315	325	310	295	A	S							
16								A	A	290	305	300	300	290	A	A	A							
17								S	250	275	300	310	300	290	260	210	S							
18								S	240	270	300	305	300	285	A	B	S							
19								S	245	A	A	A	A	290	260	215	S							
20								S	275	A	A	A	A	A	A	S	S							
21								S	S	305	315	325	310	A	A	S	S							
22								A	A	275	290	280	280	270	S	S	S							
23								S	S	A	A	A	280	A	S	S	S							
24								S	230	275	290	300	295	275	S	S	S							
25								A	A	A	275	290	290	260	S	S	S							
26								S	A	250	270	285	280	265	240	S	S							
27								S	C	C	C	C	C	C	C	S	S							
28								S	A	A	A	A	280	270	245	210	S							
29								S	215	245	280	290	280	270	S	S	S							
30								S	S	S	275	285	285	S	S	S	S							
31																								
No.								7	16	22	25	25	27	25	17	10							1	
Median								205	250	275	300	305	300	290	270	230							170	

foE

# IONOSPHERIC DATA

Lat. 45° 23.6' N  
Long. 141° 41.1' E

## Wakkanai

135° E Mean Time (GMT. + 9h.)

foEs

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	E	E	E	E	E	S	S	S	G	G	G	G	G	G	G	S	E	E	E	E	E	E	E
2	E	E	E	E	E	E	G	S	G	G	G	G	G	G	G	S	2.7	1.9	E	E	7.2.8	7.2.5	2.8 <sup>M</sup>	E
3	E	E	E	E	E	E	G	G	G	4.0	G	J4.0	G	G	G	G	S	E	E	E	E	E	E	2.4
4	E	E	E	E	E	E	G	G	G	3.3	3.9	3.5	J5.5	G	G	G	S	E	E	E	E	E	E	E
5	2.2	2.5	E	E	E	S	3.2	3.5	3.5	3.5	4.0	4.0	3.5	3.3	4.3	J2.8	S	J2.8	J2.8	3.7	7.4.0	7.6.0	J2.8	J2.8
6	J2.8	J2.8	J2.3	J1.8	E	E	G	G	J4.8	4.5	G	3.7	3.5	G	3.2	G	S	E	E	E	E	E	J2.8	7.6.5
7	J2.4	J2.8	2.4	E	E	E	G	G	3.3	4.1	3.3	G	2.9	2.9	G	2.9	2.1	2.3	2.7 <sup>M</sup>	2.0	E	7.2.6	E	E
8	J2.8	J2.8	J2.8	1.9	E	E	J3.1	S	G	3.5	3.6	G	3.4	3.4	3.0	2.6	J2.8	E	E	E	E	E	E	E
9	S	E	E	E	E	E	S	S	G	3.4	3.4	3.5	3.3	3.3	G	2.6	2.6	2.4	E	E	E	E	E	E
10	E	E	E	E	E	E	S	S	S	3.2	3.5	G	G	G	G	S	2.5	E	2.1	J2.8	3.2	J2.8	J2.6	E
11	J2.3	J2.6	J2.8	J2.5	2.0	E	S	S	G	3.1	G	G	G	B	3.9	S	S	2.2	J4.5	6.1	6.0	J5.1	J3.8	J3.7
12	J2.8	J2.3	E	E	J2.8	J2.8	G	S	G	3.1	4.5	3.4	G	3.2	3.0	J2.8	J3.2	J2.8	J2.5	J2.8	3.5	J4.8	E	E
13	E	2.5	E	1.2	E	E	G	G	2.8	2.9	G	G	G	G	J3.2	S	S	S	S	S	E	E	2.1	J3.0
14	4.3	J2.8	J6.2	J9.2	7.3	J3.0	J5.9	J5.9	J5.0	J5.2	3.5	3.4	3.5	B	3.2	S	2.0	E	2.1	E	E	J2.5	J2.8	J4.0
15	J2.8	J2.6	J1.8	E	J1.8	E	G	G	G	3.5	2.8 <sup>4</sup>	3.3	B	B	G	3.4	S	E	E	2.1	J6.0	J6.3	J3.8	2.2
16	2.3	E	E	E	E	E	J5.3	J5.3	4.2	3.3	2.5 <sup>4</sup>	G	3.5	J3.3	2.9	J3.0	J3.0	E	E	E	E	E	E	E
17	E	1.9	E	E	1.2	E	S	S	G	4.0	G	3.5	3.2	3.2	G	G	S	J2.8	E	E	E	E	E	E
18	E	E	E	E	E	E	J3.0	J3.0	J3.0	4.0 <sup>0</sup>	3.5	G	2.8 <sup>4</sup>	2.6 <sup>4</sup>	J2.8	B	S	E	E	E	E	E	E	E
19	J2.4	J2.8	J2.6	J2.8	E	E	G	S	G	3.4	J3.0	3.5	3.5	G	G	G	S	E	E	E	E	J2.8	E	E
20	J2.8	3.2	J2.5	J3.0	J2.5	2.8	J2.5	S	J5.0	2.9	3.2	3.9	J3.5	J3.3	J2.8	2.6	S	E	J2.8	J6.0	J2.8	6.3	J2.7	J2.2
21	E	E	E	E	2.0	E	E	S	S	3.5	G	2.8 <sup>4</sup>	G	3.5	3.5	S	S	E	E	E	E	E	E	3.1
22	E	E	E	E	E	E	J5.0	J5.0	J4.8	J5.8	G	2.8	3.1	3.1	S	S	S	E	E	E	E	E	E	E
23	E	E	E	E	J2.8	2.4	S	S	S	2.9	3.2	3.5	3.2	3.3	S	S	S	E	2.1	E	E	E	E	E
24	E	E	E	E	E	E	S	S	G	G	2.6 <sup>4</sup>	3.2	J5.2	G	S	S	S	E	2.4	E	E	J3.5 <sup>M</sup>	J2.8	J4.0
25	3.5	J2.0	3.5	J2.8	J2.2	E	E	2.2	J2.8	3.5	3.5	3.5	3.5	2.5 <sup>4</sup>	S	S	S	E	E	E	E	S	E	E
26	J2.4	E	2.6	E	2.1	E	J3.8	S	3.0	G	G	G	G	G	G	S	S	E	7.2.5	E	E	E	E	E
27	E	E	E	J1.8	2.5	E	S	S	C	C	C	C	C	C	C	S	S	E	J2.8	E	E	E	E	E
28	J2.8	J2.2	J3.3	1.8	E	E	J4.2	J5.2	J8.5	J4.5	3.1	3.5	2.6	G	G	G	S	E	E	E	E	J2.8	J2.8	3.5
29	E	J2.3	E	E	E	E	S	S	J3.3	G	G	G	G	G	G	S	E	E	E	E	E	E	E	E
30	E	E	E	E	E	E	S	S	S	S	G	G	G	S	S	S	S	E	E	E	E	E	E	E
31																								
No.	29	30	30	30	30	29	28	13	23	28	29	29	28	25	23	15	9	29	29	29	30	30	30	30
Median	E	E	E	E	E	E	E	G	2.8	3.4	G	3.2	3.1	G	2.8	2.6	2.6	E	E	E	E	E	E	E
U.Q	2.8	2.5	2.6	2.3	2.1	E	4.2	4.1	4.2	4.0	3.5	3.5	3.5	3.3	3.2	2.8	2.9	E	2.5	2.7	2.8	2.8	2.8	2.8
L.Q	E	E	E	E	E	E	G	G	G	2.9	G	G	G	G	G	G	2.0	E	E	E	E	E	E	E
Q.R																								

Sweep 1.0 Mc to 2.7 Mc in  $\frac{\text{min}}{\text{sec}}$  in automatic operation.

The Radio Research Laboratories, Japan.

foEs

W 4

# IONOSPHERIC DATA

Lat. 45° 23.6' N  
Long. 141° 41.1' E

**Wakkanai**

135° E Mean Time (GMT. + 9h.)

**fbEs**

**Nov. 1960**

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		GT						S								
2															2.7	S	2.5	E		2.6	2.5	2.5			
3										GT		3.7					S		E					E	
4					E					2.4	2.5	GT	3.6		2.7		S		E		2.5	E	E	E	
5	E	GT				S		GT	2.7	3.0	GT	2.9	2.8	3.0	2.9	2.0	S	2.5	E	E	2.6	E	E	E	
6	E	E	E	E					2.7	3.0	2.7	2.8		2.6	3.0		S		E				E	2.6	
7	E	E	E	E					GT	2.7	3.2	GT	GT	GT	2.7	2.5	2.1	E	2.4	E	2.4				
8	E	2.5	2.5	2.2	E				3.2	3.2	2.6	GT	GT	GT	2.7	2.5	2.4	E			2.4				
9	S						S	S	S	GT	GT	GT	GT	GT	GT	2.5	2.4	E							
10							S	S	S	GT	GT	GT	GT	GT	GT	S	2.1	E							
11	E	E	2.5	E	E	E	S	S	3.0	3.0	3.0	3.0	2.5	B	3.5	S	S	E	E	2.5	2.5	2.5	2.5	2.5	
12	E	E	E	E	E	E			2.6	2.7	3.2			2.4	2.7	2.4	2.4	E	4.5	4.5	3.0	A	2.5	2.5	
13					E				GT	2.8	GT	GT	GT	GT	3.0	S	S	S	2.2	2.4	2.5	2.3			
14	2.9	E	E	A	E	A	E	2.6	4.7	GT	GT	3.4	GT	B	GT	S	S	E					GT	2.5	
15	2.4	E	F		E		E	E	2.5	2.4	2.5	2.5	B	B	GT	2.5	2.0	E	E	A	2.6	E	E	2.6	
16	E	E	E		E		E	E	2.7	3.0	2.4	2.7	2.5	2.4	2.6	2.5	2.4							E	
17					E		S	S	GT	3.0	2.7	2.7	2.4	2.4	2.4	2.5	S	2.4							
18					E		S	S	2.7	3.0	3.0	3.0	2.8	2.5	2.8	B	S								
19	E	E	E	2.5	E	E	S	S	2.7	2.7	3.0	3.0	3.0	3.0	2.6	2.4	S				A	2.5			
20	2.4	E	E	E	E	E	F	S	2.8	2.7	3.0	3.4	3.0	3.0	2.6	2.4	S				2.5	2.5	A	2.5	
21					E		S	S	S	3.2	2.6	2.6	3.0	3.0	2.7	S	S						A	2.5	
22					E		A	S	4.6	3.2	2.6	2.6	GT	GT	GT	S	S								
23				E	2.4	E	E	S	S	2.7	2.9	3.0	2.4	2.7	S	S	S	E	E				2.5		
24							S	S	S	2.7	2.4	2.4	GT	GT	S	S	S	E	E		A	E	E	A	
25	2.5	E	E	2.5	E		2.1	2.5	2.8	2.8	2.5	2.5	3.0	2.4	S	S	S					S			
26	E	E	E	E	E	E	S	S	2.4	C	C	C	S	C	C	S	S	E	E						
27					E		S	S	C	C	C	C	C	C	C	S	S	E	E				2.5	E	
28	E	E	E	E	E	E	S	S	2.6	2.7	3.0	2.4	2.4	2.8	2.6	S	S			E	E	2.5	2.5	2.5	
29							S	S	S	2.7	S	S	S	S	S	S	S								
30							S	S	S	S	S	S	S	S	S	S	S								
31							S	S	S	S	S	S	S	S	S	S	S								
No.	14	15	12	14	13	5	6	6	13	23	17	17	16	14	14	8	8	7	12	10	12	13	15	12	
Median	E	E	E	E	E	E	E	E	2.6	2.6	2.5	2.5	2.4	2.7	2.5	2.5	2.4	E	E	2.3	2.5	2.5	2.5	2.5	



Lat. 45° 23.6' N  
Long. 141° 41.1' E

**Wakkanai**

**IONOSPHERIC DATA**

135° E Mean Time (GMT. + 9h.)

**(M3000)F2**

**Nov. 1960**

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	U <sub>280</sub> R	270	270	270F	265	270F	285	U <sub>310</sub> S	305	U <sub>325</sub> R	320	315	325	U <sub>325</sub> R	325	305	320	325	280	310	295	290	295	295-
2	270	280	265	280	270	275	270	315	315	330	315	315	335	315R	310	330	310	310	295	330	285	275	275	260
3	270	275	310	270	290	270	295	320	315	305	315	315	330	305	310	330	320	310	300	270	280	280	250	270
4	265	290	275	265	285	270	275	340	325	R	U <sub>315</sub> R	315	300	305	U <sub>310</sub> R	310	U <sub>300</sub> R	290S	280	270	270	270	270	280
5	285	255	240	245	250	275	275	310	315R	310R	305R	315	315	310	325	305	305	285	315	285	285	270	300	280
6	265	260	260	270	275	270	280	300	330R	U <sub>320</sub> R	310R	320	315	U <sub>315</sub> R	305	320	335	275	300	300	300	300	305	275
7	270F	280	285	285	280	275	270	U <sub>330</sub> S	335R	320	320	310	310	315	310	U <sub>315</sub> R	275	300	295	305	305	275	265	260S
8	255	280	295	285	300	270	275	U <sub>320</sub> R	310	325	310	U <sub>320</sub> R	310	330	325	310	300	310	330	300	300	300	300	285
9	270	265	270	285	270	270	300	335R	325	310	310	310R	320	305	315	315	305	305	300	300	300	280	270	270
10	260	275	280	285	280	275	315	315	340R	325	315R	315R	320R	305R	315R	325	U <sub>330</sub> R	310	305	300	300	280	270	255
11	260	260	265	270	280	270	270	315	325R	320R	305	315R	320	310R	305R	315	290	U <sub>285</sub> S	270	295	U <sub>280</sub> S	U <sub>260</sub> A	260	255
12	300	290	270	265	265	270	275	310	335	310	310R	305	305	310	310	315	310	295	300	290	300	280	270	275
13	280	260	265	275	250	270	265	330	305	U <sub>290</sub> R	275	285	270	270	280	265	270	235	245	U <sub>260</sub> R	F	F	FS	FS
14	FS	255F	250F	240A	270F	A	270	280	R	240	335	A	310	U <sub>320</sub> R	U <sub>320</sub> R	320	295	300	300F	F	FS	F	FS	285F
15	290	F	F	F	F	F	270F	325	340R	335	325	320	B	310	310	310	320	280	305	320	A	280	300	285F
16	265F	U <sub>260</sub> F	260	265F	265F	305F	245	285	325R	275	285	270	U <sub>270</sub> R	R	270	U <sub>300</sub> R	310R	280	275	U <sub>285</sub> S	280	270	305	275
17	305	250	255	275	300F	320	295	335	310	R	315	320R	U <sub>320</sub> R	310	310	305	U <sub>320</sub> R	310	320	305	325	275	285	285F
18	275F	F	F	F	260F	295	330	335	310	320	325R	315	330	U <sub>320</sub> R	320	310	330	310	315	305	320	270	270	275
19	280	300	285	285	295	285	275	325	315	340	U <sub>315</sub> R	320R	330R	315	325	U <sub>325</sub> R	U <sub>330</sub> R	305	310	310	310	270	270	265
20	275	275	275	270	280	280	300	325	310	305	R	315R	325	U <sub>315</sub> R	315R	320	315	315	310	315	285	U <sub>300</sub> A	270	270
21	265	270	265	265	275	270	280	335	320	325	330	325	U <sub>320</sub> R	325	315	U <sub>310</sub> R	320	275	305	340	270	265	U <sub>265</sub> A	260
22	265	260	260	260	250	265	270	U <sub>295</sub> A	275	285	280	305	305	320	320	330	345	295	295	U <sub>305</sub> R	310	285	305	310
23	275	275	275F	270	F	FS	FS	340	325	U <sub>315</sub> R	330	320R	335	330	330	U <sub>330</sub> S	330	300	300	315	320	270	285	270
24	270	275	280	270	280	270	310	330	335C	315	320R	325	330	310	330	330	310	330	305	310	320	285	275F	270A
25	270	270	280	280	270	275	275	325	310	315R	R	R	335	330	330	325	320	310	320	320	275	285	275	275
26	335	260A	265	270	270	270	280	325	325	R	R	R	U <sub>330</sub> R	U <sub>325</sub> R	U <sub>330</sub> R	U <sub>315</sub> R	315	335	325	280	275	275	285	
27	295	280	275	285	295	320	280	320	C	C	C	C	C	C	340	310	310	315	320	300	335	270	270	275
28	265F	270	265	275	275	280F	275	320	325	305	U <sub>320</sub> R	330R	305	315	U <sub>330</sub> R	340	330	315	300	340	270	270	270	270
29	280	270	275	285	280	285	270	345	330R	345	325R	330	325	325	330	330	330	310	320	300	275F	280	280	280
30	300F	285	280F	285	270	305	305	345	315	U <sub>330</sub> R	335	340	340R	315	350	330	320	340	345	325	295	275	285	280
31																								
No.	29	28	28	28	28	28	28	30	28	26	26	26	28	27	27	30	30	30	30	30	27	28	28	28
Median	270	270	270	270	280	280	270	325	320	320	315	315	320	315	315	320	320	310	315	305	300	275	275	275

Sweep /  $\mu$  Mc to 24.7 Mc in / min ~~see~~ in automatic operation.

The Radio Research Laboratories, Japan.

**W** 7

**(M3000)F2**



IONOSPHERIC DATA

Lat. 45° 23.6' N  
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT. + 9h.)

(M3000) F1

Nov. 1960

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										L															
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13										L															
14																									
15										L		LH													
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21																									
22										32.5	340	L													
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26																									
27									C	C	C	C	C	C	C										
28																									
29																									
30																									
31																									
N.O.										/	/														
Median										32.5	340														

The Radio Research Laboratories, Japan.

Sweep / 0 Mc to 2.0 Mc in / min sec in automatic operation.

(M3000) F1

# IONOSPHERIC DATA

Lat.  $45^{\circ}23.6'N$   
 Long.  $141^{\circ}41.1'E$

Wakkanai

135° E Mean Time (GMT. + 9h.)

R'F2

Nov. 1960

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																								
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15												L												
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18																								
19																								
20																								
21																								
22										360	330L	305	L											
23																								
24																								
25																								
26																								
27									C	C	C	C	C	C	C	C								
28																								
29												L												
30																								
31																								
No.																								
Median																								

R'F2

IONOSPHERIC DATA

Lat. 45° 23.6' N  
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT.+ 9h.)

Nov. 1960

f'F

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	300	330	310	300	310	330	285	240	220	240	225 <sup>H</sup>	240	230	210 <sup>H</sup>	240	230	220	200	260	250	250	310	305	300	
2	305	285	280	300	270	270	250	215 <sup>H</sup>	225	220	210 <sup>H</sup>	220	220	215	235	230	220	215	240	250	270	350	340	340	
3	335	285	240	260	260	250	235	235	225	220	210 <sup>H</sup>	240	225	220	235	240	210	230	240	250	270	280	310	310	
4	285	250	250	285	275	260	255	235	235	235	230	245	235	245	245	235	220	220	260	260	260	270	290	260	
5	260	250	360	350	300	270	270	245	240	235	220	235	240	230	225	230	240	235	240	250	300A	300	250	240	
6	350	375	340	270	260	310	260	245	240	235	230	230	230	220	245	230	220	215	260	250	250	260	260	385	
7	350	300	270	270	270	310	260	220	240	230	220	235	225	225	240	240	225	220	260	255	245	280	320	350	
8	350	315	320	300	260	280	265	235	210	225	235	245	240	240	215	220	210	225	230	245	250	270	270	335	
9	340 <sup>S</sup>	350	320	270	260	260	270	225	220	220	215	235	240	240	240	240	210	215	250	240	240	300	320	315	
10	325	310	270	250	245	250	235	235	235	235	235	240	240	240	240	240	215	215	245	260	260	330	370	350	
11	340	340	350	310	275	270	250	235	230	230	235	240	240	245	245	235	210	215	A	A	A	370A	370	370	
12	260	215	310	310	345	345	310	245	240	225	240	225	235	235	240	245	225	225	245	250	265	300A	315	310	
13	320	360	370	310	440	415	315	235	240	260	230	240	270	250	265	275	270	345	370	315	270F	210F	345F	335	
14	250F	530	575	480A	365	A	340	270	335A	285	240	235	230	230	235	225	220	210	250	245	250	275	285	325	
15	335	350	370	300	300	260	275	230	230	270	220	210 <sup>H</sup>	230 <sup>S</sup>	245	275	230	230	210	250	250	A	370A	300	310	
16	370	435	400	400	350	335	260A	230	230	240	240	245	225	245	210	230	230	250	285	260	250	260	240	240	
17	260	350	325	310	240	240	270	220	230	240	230	230	235	240	235	225	225	240	240	240	225	320	270	300	
18	320	335	340	340	320	265	235	210	225	220	205 <sup>H</sup>	240	235	225	230	225	220	210	225	260	260	310	300	370	
19	325	310	300	350A	285	285	250	220	235	225	215	205 <sup>H</sup>	240	230	230	220	215	240	235	240	280A	400A	310	370	
20	390	345	340	300	300	275	260	235	235	235	240	240	240	240	240	230	270	220	250	310	235	300A	310	300	
21	315	310	340	290	270	260	230	230	235	240	240	240	230	235	225	235	225	240	260	235	245	300	360A	430A	
22	380	360	370	370	445	385	370	305 <sup>H</sup>	285 <sup>H</sup>	275	260	230	245	260	230	240	220	240	260	250	265	270	265	260	
23	310	310	345	350	340	310	250	225	230	235	235	220	220	240	235	220	210	240	250	250	250	265	310	300	
24	300	270	265	305	275	270	240	235	220	225	220	230	235	220	230	220	215	240	250	260	260A	280	260	310A	
25	370A	320	310	400A	320	325	305	280	235	235	235	225	220	220	240	240	230	230	215	260	330	400 <sup>S</sup>	320	270	
26	250	370 <sup>S</sup>	400	350	365	350	340	250	225	225	220	220	225	230 <sup>H</sup>	230	225	210	220	220	245	325	300	345	315	
27	300	335	310	280	270	265	270	250	C	C	C	C	C	C	C	225	225	220	265	250	225	340	400	340	
28	370	330	320	310	270	275	260	220	235	230	240A	240	220	220	230	215	215	235	220	260	240	A	A	A	
29	310	335	300	260	270	285	275	240	225	240	210 <sup>H</sup>	210 <sup>H</sup>	220	235	235	220	210	250	245	250	235	320	320	300	
30	320	280	300	280	270	260	250	230	240	220	225	215	240	210	210 <sup>H</sup>	210	225	210	220	245	270	310	320	320	
31																									
No.	30	27	30	30	30	29	30	30	29	29	29	29	29	29	29	30	30	30	29	29	28	28	29	29	
Median	320	330	320	300	290	285	260	235	230	230	235	235	235	235	235	230	220	220	245	250	260	300	310	310	

Sweep 1.0 Mc to 20.7 Mc in 1/10 sec in automatic operation.

f'F

The Radio Research Laboratories, Japan.

W 10

# IONOSPHERIC DATA

Lat. 45° 23.6' N  
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT. + 9h.)

R'ES

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E	E	E	E	E	E	S	S	S	G	G	115	G	G	G	S	S	E	E	E	E	E	E	E	
2	E	E	E	E	E	E	G	S	G	G	G	G	G	G	105	S	105	105	E	105	E	100	100	E	
3	E	E	E	E	E	E	G	G	G	120	G	110	G	G	G	G	S	E	110	E	E	E	E	110	
4	E	E	E	E	100	E	G	G	G	110	120	120	110	G	105	G	S	E	E	115	110	110	110	E	
5	110	110	E	E	E	S	S	S	125	125	120	115	110	105	105	110	S	105	105	110	110	110	110	110	
6	105	105	105	105	E	E	G	G	105	105	110	G	105	G	120	G	S	E	E	E	E	E	110	105	
7	100	100	100	100	E	E	G	G	120	105	110	G	105	G	105	105	105	105	105	110	E	105	E	E	
8	105	105	110	105	E	E	110	G	G	105	130	G	135	120	120	105	100	E	E	E	105	E	E	E	
9	S	E	E	E	E	E	S	G	G	G	135	120	120	G	G	115	100	100	E	E	E	E	E	E	
10	E	E	E	E	E	E	S	G	G	160	140	G	G	G	G	105	105	E	105	105	110	110	105	E	
11	110	100	100	100	110	E	S	S	G	110	G	G	G	8	105	S	S	110	110	110	110	110	105	105	
12	105	105	E	E	110	115	G	G	110	105	105	G	G	105	105	105	100	100	110	110	105	110	E	E	
13	E	100	100	105	110	E	E	G	125	115	G	G	G	G	110	S	S	S	S	S	E	E	150	115	
14	110	110	110	105	110	105	115	120	115	110	120	115	110	110	115	S	100	E	110	E	E	105	105	100	
15	105	105	105	E	110	E	E	G	G	110	110	105	105	105	105	100	S	E	E	110	105	110	110	110	
16	110	E	E	E	E	110	110	110	105	105	105	G	110	105	100	100	100	E	E	E	E	E	E	E	
17	E	110	E	110	105	E	S	G	G	125	110	110	110	110	G	G	S	110	E	110	E	E	E	E	
18	E	E	E	E	E	E	S	S	115	110	110	G	110	105	105	B	S	E	E	E	E	E	E	E	
19	105	105	110	100	E	E	S	G	110	110	110	110	105	105	105	G	S	E	E	E	E	110	105	E	E
20	110	110	105	105	105	110	105	S	110	110	110	105	105	105	105	105	S	E	110	105	110	105	110	110	
21	E	E	E	E	110	E	E	S	110	110	G	105	G	105	100	S	S	E	E	E	E	E	110	110	
22	E	E	E	E	E	E	110	S	110	105	G	110	145	125	S	S	S	E	E	E	E	E	E	E	
23	E	E	E	100	120	115	110	S	110	110	105	150	150	100	S	S	S	E	105	E	E	E	105	E	
24	E	E	E	E	E	E	S	G	G	115	105	100	100	G	S	S	S	E	110	E	110	110	110	110	
25	105	110	100	100	100	E	E	110	110	110	105	105	105	105	S	S	S	E	E	E	E	S	E	E	
26	110	E	100	E	110	E	110	S	120	G	G	G	G	G	G	S	S	E	100	E	E	E	E	E	
27	E	E	E	100	100	E	S	S	C	C	C	C	C	C	C	S	S	E	105	E	E	E	110	110	
28	110	105	105	105	E	E	S	110	110	110	105	105	110	100	115	G	S	E	E	E	110	110	105	110	
29	E	105	E	E	E	E	S	S	105	G	G	G	G	G	S	S	E	E	E	E	E	E	E	E	
30	E	E	E	100	E	E	S	S	S	S	G	G	G	G	S	S	S	E	E	E	E	E	E	E	
31																									
No.	14	15	12	14	13	5	6	6	13	203	17	17	16	14	14	8	8	7	12	10	12	13	15	12	
Median	110	105	105	100	105	110	110	110	110	110	110	110	110	110	105	105	105	105	105	110	110	110	110	110	

Sweep  $\frac{1}{0}$  Mc to  $20.7$  Mc in  $\frac{1}{sec}$  in automatic operation.

The Radio Research Laboratories, Japan.

R'ES

W 11

IONOSPHERIC DATA

Lat. 45° 23.6' N  
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT.+9h.)

Types of Es

Nov. 1960

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	f		f	f2				
2												l			l			f		f	f2				
3												l			l			f		f	f2				
4												l			l			f		f	f2				
5												l			l			f		f	f2				
6												l			l			f		f	f2				
7												l			l			f		f	f2				
8												l			l			f		f	f2				
9												l			l			f		f	f2				
10												l			l			f		f	f2				
11												l			l			f		f	f2				
12												l			l			f		f	f2				
13												l			l			f		f	f2				
14												l			l			f		f	f2				
15												l			l			f		f	f2				
16												l			l			f		f	f2				
17												l			l			f		f	f2				
18												l			l			f		f	f2				
19												l			l			f		f	f2				
20												l			l			f		f	f2				
21												l			l			f		f	f2				
22												l			l			f		f	f2				
23												l			l			f		f	f2				
24												l			l			f		f	f2				
25												l			l			f		f	f2				
26												l			l			f		f	f2				
27												l			l			f		f	f2				
28												l			l			f		f	f2				
29												l			l			f		f	f2				
30												l			l			f		f	f2				
31												l			l			f		f	f2				
No.																									
Median																									

Sweep 1.0 Mc to 20.7 Mc in 1 min in automatic operation.

Types of Es

The Radio Research Laboratories, Japan.

W 12

# IONOSPHERIC DATA

Lat. 39° 43.5' N  
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT.+9h.)

foF2

Nov. 1960

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	4.1	4.0	4.1	4.0	4.2	4.0	4.6	8.6	C	C	C	C	C	C	C	C	C	7.6	5.4A	5.0	5.1	4.3	4.4	4.3
2	4.3	3.9	3.7	3.7	3.7	3.8	4.6	8.5	12.0	12.0	12.2	12.5	12.5	11.5	12.0	10.8	9.3	7.5	5.5	5.3	4.6	4.2	4.3	4.1
3	4.5	4.6	4.5	3.1	3.3	3.6	4.6	8.1	11.0	10.2	12.5	13.6	13.1	12.3	11.7	11.2	11.0	7.1	6.0	6.0	5.3	5.1	4.9	5.0
4	5.0	5.0	4.5	4.2	4.0	4.0	4.6	8.7	11.3K	11.0	11.0	12.0	11.5	12.5H	13.1	12.5	10.1	8.8	7.0	7.5	7.2	6.0	6.1	5.9
5	5.6	5.1	4.6	4.6	4.9	4.5	6.1	4.9K	12.4	12.0	13.1H	13.5	13.6	11.3	11.5	10.6	9.5	9.0	7.5	5.5	5.0	5.0	5.1	4.4
6	4.0	4.1	4.1	4.5	4.0	3.8	5.4	10.6	12.2	13.1	13.3	12.5	11.4	10.9	12.0	11.4	9.6	6.9	6.2	6.3	5.5	4.2	3.8A	3.6
7	3.9	4.1	4.4	3.9	3.9	3.6	5.2	1.98K	10.1	11.1	12.7	12.1	11.8	11.9	12.4	10.8	9.1	8.0	6.5	5.8	5.5	4.3	4.0	4.1.5
8	4.2	4.5	4.5	4.5	4.1	3.5	4.9	9.0	11.0	11.0	12.1	12.4	12.9	12.2	11.0	9.9	9.1	7.4	7.0	5.4	4.8	3.9	3.5	3.5
9	3.5	3.6	3.6	3.6	3.9	3.9	4.4	8.4	10.2	10.6	11.1V	12.8	12.5	12.1	12.5	11.8	10.1	7.8	6.2	5.7	4.7	4.0	3.8	3.7
10	4.0	4.0	4.0	3.9	3.5	3.5	4.6	8.4	9.4	11.4	11.1	11.1	11.0	12.1H	12.0	10.8	9.6	7.1	6.3	5.4	4.6	3.9	3.5	3.6
11	3.9	4.0	4.0	4.3	3.8	3.8	4.8	9.0	10.9	12.2	12.6	13.2H	12.8H	12.2	12.3	12.1	10.3	8.1	7.0	6.6	5.3	4.0	4.1	3.0
12	4.7A	4.0	3.3	3.5	3.5	3.5	4.7	4.96K	11.9	11.8	12.0H	12.5	11.9H	12.5	12.0	11.4	10.5	8.3	6.8	5.5	4.4	3.7	3.5	3.6
13	3.8	3.5	3.6	3.8	3.1	3.1	4.7	8.0	9.1	12.6H	11.1	14.0	14.1H	13.2	11.4	10.9	10.9	10.3W	11.5W	13.4	F	F	F	F
14	F	F	F	F	F	F	F	8.9F	13.1	14.3E	12.0	12.5	11.6	11.6	11.5	11.0	8.5K	8.0	7.4	5.5	4.2	4.5F	4.4.5	3.8
15	4.0	3.6	4.0	C	C	C	C	C	C	12.3	12.3	12.9R	13.9E	13.0	11.3R	15.0H	8.5	7.9	5.5A	5.0	4.6A	3.8R	3.7	3.4
16	3.0A	2.9	3.0	2.9	3.0	3.3	3.4	4.67R	11.1	10.5	13.6	12.3H	15.1R	11.6	12.3	13.2	10.7K	8.5	7.3	7.7	7.8	7.4F	7.1	4.9
17	4.1	4.0	4.0	4.1	4.0	3.3	3.9	8.3	8.7	12.5H	13.1	13.0	11.8	11.0	11.3	10.4	9.5K	7.1	6.0	5.9	4.2	3.3	3.4	3.2
18	3.3	3.4	3.4	3.5	3.6F	3.6	4.7R	8.2	8.0	11.1	11.9	12.6	12.5H	12.0	10.3	10.8	10.3	6.0	5.7	3.5H	3.7	2.9H	3.5	3.5
19	3.4	3.5	3.2	3.4F	3.4	3.4	4.4	7.6	8.9	10.0	11.4	11.6	10.9	11.1	10.4	9.5	7.8C	5.4	5.2	A	A	A	3.2	3.4
20	3.4A	3.5	3.5	3.5	3.7	3.4	4.0	7.3	8.5	10.9	12.1	12.5	12.2	11.1	10.5	10.0	8.5	6.8	5.9	3.4	3.5A	3.3	3.0	3.5A
21	3.7F	F	F	F	4.0	4.0	4.6	8.0	10.4	11.1	11.4	11.5	10.6	11.9	C	C	9.6	6.9	7.1	6.5	3.4	3.4	3.1	3.4R
22	3.4	3.4	3.1	3.1	3.9F	2.6	2.8	6.1	8.4K	9.9	11.8C	11.1	11.0	10.1	9.9	9.1	8.6	5.2	4.5	4.7	3.6	3.4	4.1	3.2
23	2.9	3.0	3.3F	3.1	3.3	3.3	4.4	7.5	8.7	11.7	13.2	13.0	11.6	10.8	10.2	9.8	7.0	4.5	4.5	5.0	3.9	3.6	3.4	3.5
24	3.5	3.5	3.5	3.5	A	3.5	4.3	7.8	10.0K	10.1	11.5	12.7	12.0	11.0	9.0	8.6	6.9	5.1	5.4	5.1	5.1	3.6	3.0	3.0
25	3.3	3.5	3.5	A	3.5	3.8	3.8	7.9R	9.6	10.9	12.1	13.8	11.5	10.2	9.5	9.1	10.6	8.0	6.2	3.0	3.3	3.5	3.9	4.4
26	3.8	2.5	2.5	2.7	2.7	2.7	3.2	7.4	11.5	11.8	14.0	12.7	11.5	10.9	11.7	10.4	8.8	5.5	4.9	3.4	3.1	3.2	3.2	3.4
27	3.1	3.0	3.1	2.8	2.7	3.0	3.3	6.9	10.6R	10.1	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	3.4	3.3	3.4	3.5	3.0	3.8C	6.5	9.2R	11.1R	13.5	13.5	11.4C	11.3	10.8C	9.4	7.9	6.3	4.6	4.2C	4.0	3.0	3.3	3.4
29	3.5A	3.5	3.6	3.6	3.3	3.3	3.5	7.6R	8.2	10.2	11.5	11.5R	11.1	9.5	9.0	8.5	7.9	5.6	4.4	4.1	3.2	3.0	3.1	3.1
30	3.4	3.4	3.4	3.4	3.3	3.4	3.5	6.6	9.0	10.8	12.0	10.6H	9.7	9.1	9.1	8.1	7.4	6.8	5.1	3.6F	3.0	2.9	3.2C	3.4
No.	28	28	28	26	27	28	28	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.8	2.9	2.9	2.8	2.7	2.7	2.8	2.8
Median	3.8	3.6	3.6	3.6	3.5	3.5	4.5	8.1	10.2	11.1	12.1	12.5	11.8	11.6	11.4	10.8	9.5	7.1	5.9	5.4	4.6	3.8	3.6	3.6
U.E.	4.1	4.0	4.0	4.0	3.9	3.8	4.7	8.8	11.2	11.9	13.1	13.0	12.6	12.2	12.0	11.4	10.2	8.0	7.0	6.0	5.1	4.3	4.2	4.2
L.E.	3.4	3.4	3.3	3.4	3.3	3.3	3.8	7.3	9.0	10.6	11.6	11.8	11.4	11.0	10.3	9.5	8.5	6.2	5.2	4.4	3.6	3.3	3.2	3.4
O.R.	0.7	0.6	0.7	0.6	0.6	0.5	0.9	1.5	2.2	1.3	1.5	1.2	1.2	1.2	1.7	1.9	1.7	1.8	1.8	1.6	1.5	1.0	1.0	0.8

The Radio Research Laboratories, Japan.

A 1

Sweep 160 Mc to 220 Mc in  $\frac{1}{20}$  sec in automatic operation.

foF2

IONOSPHERIC DATA

Lat. 39° 43.6' N  
Long. 140° 08.9' E

Akita

foF1

Nov. 1960

135° E Mean Time (GMT.+9h.)

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	C	C	C								
2																									
3										L	L	L	L	L	L	L	L								
4																									
5																									
6																									
7																									
8										L	L														
9										L	L														
10																									
11																									
12																									
13																									
14																									
15										C		L	B												
16																									
17																									
18																									
19										3.6		L	H												
20																									
21										L	C	L	L	L	C	C									
22											L	L	L	L											
23											L	L	L	L											
24																									
25													L												
26																									
27											C	C	C	C	C	C	C								
28										C	L	L	L	L											
29										L	L	L	L	L											
30										L															
31																									
No.										1															
Median										3.6															

Sweep 1.6 sec Mc to 20.0 Mc in 20 sec

The Radio Research Laboratories, Japan.

foF1

A 2

Lat. 39° 43.5' N  
 Long. 140° 08.2' E

**Akita**

**IONOSPHERIC DATA**

135° E Mean Time (GMT.+ 9h.)

**foE**

**Nov. 1960**

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							2.05	C	C	C	C	C	C	C	C	C	C							
2							2.00	2.80	3.05	I 3.20 <sup>R</sup>	I 3.30 <sup>R</sup>	3.30	A	R	A	A	A							
3							I 2.20 <sup>R</sup>	2.85	I 3.10 <sup>R</sup>	3.25	I 3.45 <sup>R</sup>	I 3.50 <sup>R</sup>	3.75	3.00	3.00	2.45	2.05							
4							2.15	2.80	3.05	3.20	3.45	I 3.30 <sup>R</sup>	3.15	2.95	2.95	2.60	B							
5							I 2.15 <sup>R</sup>	2.65	3.05	3.25	3.25	3.35	3.20	2.95	I 2.60 <sup>R</sup>	2.00								
6							2.05	2.75	3.05	3.25	3.30	3.40	3.35	3.10	2.80	B								
7							2.15	2.85	3.05	3.25	3.40	I 3.30 <sup>R</sup>	3.20	2.95	2.75 <sup>H</sup>	2.00								
8							2.10	I 2.70 <sup>A</sup>	3.10	A	A	A	A	A	A	A								
9							2.05	2.70	3.05	3.25	3.45	3.30	A	A	A	2.55	A							
10							2.10	I 2.80 <sup>R</sup>	3.05	3.30	A	A	A	A	R	A	B							
11							2.05	2.80	3.05	3.40	3.50	A	A	B	B	I 2.80 <sup>A</sup>	2.00							
12							R	A	A	A	A	3.50	A	A	A	A	A							
13							2.00	2.80	I 3.10 <sup>R</sup>	3.25	3.40	3.45	I 3.20 <sup>R</sup>	2.90	2.55	2.00								
14							R	R	3.00	3.30	R	B	B	B	B	I 2.70 <sup>H</sup>	I 2.10 <sup>A</sup>							
15							C	C	C	C	A	I 3.35 <sup>R</sup>	B	B	B	A	A							
16							2.00	A	A	A	A	A	A	R	2.85	2.55	B							
17							2.00	2.60	3.00	R	R	I 3.30 <sup>R</sup>	3.15	A	A	A	A							
18							B	R	A	A	A	A	A	A	2.90	A	A							
19							1.90	2.60	3.00	A	A	I 3.30 <sup>A</sup>	A	A	A	A	C							
20							R	R	3.00	A	A	A	A	A	A	A	A							
21							2.05	2.75	I 3.00 <sup>R</sup>	3.30	3.45	3.40	3.25	C	C	C	A							
22							A	A	R	C	A	A	3.10	3.00	2.75	2.40	B							
23							A	2.45	I 2.85 <sup>A</sup>	I 3.00 <sup>R</sup>	I 3.05 <sup>A</sup>	3.05	2.95	I 2.75 <sup>A</sup>	2.45 <sup>H</sup>	B								
24							B	I 2.40 <sup>R</sup>	2.90	3.05	3.20	3.25	A	A	A	A	B							
25							B	2.55 <sup>H</sup>	I 2.85 <sup>R</sup>	3.00	I 3.05 <sup>A</sup>	3.10	A	A	A	A	A							
26							B	R	A	A	A	3.05	I 3.05 <sup>R</sup>	3.00	R	A	A							
27							B	2.45	I 2.80 <sup>A</sup>	C	C	C	C	C	C	C	C							
28							B	A	A	A	A	A	C	R	C	2.30	B							
29							B	2.55	A	A	R	R	R	R	2.80	2.20	B							
30							B	A	I 2.85 <sup>R</sup>	3.05	3.10	3.15	3.05	2.85	2.50 <sup>H</sup>	A								
31																								
No.							16	19	21	16	16	16	18	12	12	15	6							
Median							2.05	2.70	3.05	3.25	3.30	3.30	3.30	3.20	2.90	2.55	2.00							

**foE**



Lat. 39° 43.5' N  
Long. 140° 08.3 E

# IONOSPHERIC DATA

## Akita

135° E Mean Time (GMT.+9h.)

foEs

Nov. 1960

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	21	E	E	E	E	E	E	G	C	C	C	C	C	C	C	C	C	J60	J63	J45	J24	J23	23	J20	
2	J18	20	J18	23	23	23	E	G	G	G	3.04	2.94	3.04	3.14	3.1	2.8	2.0	J23	J24	J28	22	E	22	21	
3	E	E	E	E	E	E	E	G	G	3.6	G	3.7	3.7	2.94	G	G	G	E	E	J1.9	J48	J28	21	E	
4	E	E	E	E	E	E	E	G	G	3.6	4.2	G	G	G	G	G	G	J23	J1.8	J1.9	J48	J28	21	23	
5	J24	20	E	22	21	E	E	G	G	3.5	4.0	4.7	4.4	G	G	G	G	J22	J28	E	22	J5.0	J5.0	J1.8	
6	J28	J27	J20	22	23	E	E	25	3.2	3.6	3.5	G	G	3.5	G	G	G	E	E	E	J24	J5.0	J5.0	J3.5	
7	23	J28	24	J23	J1.8	E	E	G	G	2.94	G	3.5	3.5	3.04	G	3.2	G	J1.9	E	J1.9	20	20	20	J24	
8	J20	E	E	23	J22	E	E	27	J38	J35	J4.9	J3.7	J4.3	J3.7	J3.5	2.8	J24	J28	24	E	J24	22	E	E	
9	E	E	E	E	E	21	E	G	G	G	3.5	3.6	3.8	J3.3	J2.3	J2.9	J2.7	J1.9	21	21	21	21	20	J1.8	
10	E	E	E	E	E	21	E	G	G	G	3.24	J3.8	J4.3	J3.8	G	2.9	2.0	1.9	J2.5	J2.8	J2.9	J21	23	22	
11	J1.8	23	J1.8	E	22	E	E	G	G	3.7	G	G	J4.1	B	B	3.3	G	E	E	E	E	E	21	J6.0	
12	J5.1	J2.8	J2.9	J1.8	J2.3	J1.7	E	G	J3.3	3.5	3.6	3.6	G	3.4	J5.4	J5.7	J3.0	J1.8	E	E	E	E	21	J1.8	
13	J3.5	J2.4	E	E	22	E	E	23	3.4	3.9	3.7	G	G	3.9	3.5	G	G	E	E	E	E	E	27	J4.9	
14	24	J1.8	J2.3	J3.6	E	E	E	31	J4.2	J6.3	J1.5	1.9	J6.3	B	B	G	2.3	J2.5	E	J1.8	J2.6	J5.0	21	J2.7	
15	J24	J1.8	21	C	C	C	C	C	C	C	J3.9	3.5	B	B	B	3.0	J2.7	E	J7.5	J4.0	J4.0	J5.0	J2.9	J1.8	
16	J6.3	J3.5	J2.9	E	E	E	E	25	J5.1	J5.1	J6.6	J4.2	J3.3	3.5	G	G	G	J24	J3.4	J3.1	J2.8	J2.4	22	E	
17	E	E	J2.3	J2.4	J1.8	E	E	G	G	3.4	3.5	J5.2	3.9	G	J3.2	J3.7	J2.8	J3.7	J1.8	E	E	22	J3.8	E	
18	E	E	E	20	21	E	E	G	G	3.6	J4.7	J5.3	J3.8	J3.6	J3.5	J4.9	J3.1	J3.6	J2.4	22	1.9	22	J3.8	E	
19	E	E	E	J3.8	J2.3	E	E	21	G	3.5	J3.7	J5.3	J3.3	J3.3	J3.5	2.8	G	2.4	J4.3	J7.0	J6.8	J4.4	J2.5	E	
20	J5.0	J2.5	J2.3	J2.3	24	J2.5	E	G	2.94	3.5	3.3	J3.8	J3.5	J4.0	J3.8	J3.8	J2.8	J2.9	J4.5	J5.0	J6.8	J3.8	J2.9	J4.3	
21	E	E	E	22	J1.9	J2.3	E	G	G	G	3.04	3.04	3.04	2.44	C	C	J2.8	E	E	J3.1	J2.9	J2.7	E	E	
22	J2.8	J2.3	J2.6	E	E	E	E	J3.8	J3.1	2.94	C	J3.8	G	3.4	G	G	3.4	J4.2	22	22	E	22	E	E	
23	E	E	E	E	E	E	E	J3.8	G	2.9	2.54	3.04	J3.3	2.64	J2.9	G	2.1	J2.2	J2.4	J2.0	E	J3.7	J3.3	E	
24	J1.8	20	E	22	22	E	E	G	G	G	G	G	J2.94	J3.8	J3.8	3.7	3.7	J2.3	J5.2	J6.0	J5.0	J3.7	J2.4	J4.4	
25	J3.7	J5.0	J4.3	J3.8	J4.3	J3.8	J1.8	G	G	G	G	J4.6	J3.4	J3.3	J4.4	J3.6	J3.1	J2.9	J2.4	21	E	E	E	22	
26	J24	J2.8	J2.7	J1.8	22	E	E	G	G	3.1	J3.5	G	G	G	2.64	J2.9	J3.7	J3.8	J2.9	J2.4	J2.1	22	20	E	
27	E	E	E	E	E	E	E	G	G	2.9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	E	E	J2.1	J2.4	20	C	G	J2.9	J3.4	J3.6	J3.4	C	G	G	G	G	J2.5	C	E	E	E	E	J3.5	
29	J3.9	J3.3	J2.4	J3.8	J2.5	22	J1.8	G	G	3.0	3.3	3.5	3.5	3.5	J2.9	G	G	E	E	E	E	J3.0	J2.0	J1.8	
30	23	22	J2.2	22	21	E	E	G	J2.9	3.0	J3.8	J3.5	3.5	3.5	G	G	J2.8	J2.8	20	J2.9	J2.4	E	C	E	
31																									
No.	29	30	30	29	29	29	28	29	28	28	27	28	26	25	23	27	27	29	29	28	29	29	28	29	
Median	21	20	21	22	21	E	E	G	G	3.4	3.5	3.6	3.4	3.3	2.9	2.8	2.3	2.3	2.4	2.1	2.2	2.1	1.8	1.8	
U.Q	28	27	24	24	23	E	E	G	3.0	3.6	3.9	4.0	3.8	3.6	3.5	3.3	3.0	2.8	2.8	3.0	2.8	3.4	2.6	2.6	
L.Q	E	E	E	E	E	E	G	G	G	2.9	2.5	3.0	2.9	G	G	G	G	E	E	E	E	E	1.8	E	
Q.R							0.7	1.4	1.0	0.9													0.8		

Sweep rate in automatic operation.

The Radio Research Laboratories, Japan.

foEs

IONOSPHERIC DATA

Lat. 39° 43.5' N  
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT. + 9h.)

Nov. 1960

fbEs

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E	E	E	E	E	E			C	C	C	C	C	C	C	C	C	39	A	40	20	20	E	20	
2	E	E	E	E	E	E			C	304	304	294	304	304	30	27	420 <sup>B</sup>	18	25	24	19	E	E	E	
3	E	E	E	E	E	E				31	4	4	34	284			20	21	E	E	E	E	E	E	
4	E	E	E	E	E	E				4	38	38	37				20	18	E	E	E	E	E	E	
5	E	E	E	E	E	E				33	36	35	37	35								E	20	A	20
6	E	E	E	E	E	E			29	294	31	30	304	31				E	E	E	E	E	E	24	
7	E	1.8	E	E	E	E			35	23	38	36	37	36	35	28	23	17	E	E	E	E	E	E	
8	E	E	E	E	E	E			35	23	35	36	38	33	31	22	27	21	E	E	E	E	E	E	
9	E	E	E	E	E	E					304	38	42	38	29	29	20	E	20	25	20	19	E	E	
10	E	E	E	E	E	E						35	36	B	30								E	E	
11	E	E	E	E	E	E			30	31	35	35	36	34	46	45	20	E					E	E	
12	A	E	2.1	E	E	E			29	36	35	35	45	35	30								E	E	
13	2.5	E	E	E	E	E			30	40	53	45	45	B	B	30	23	18				E	E	1.7	
14	E	E	E	E	E	E			C	C	34	27	B	B	B	30	25	23	A	28	E	E	E	E	
15	E	E	E	E	E	E			C	C	34	27	B	B	B	30	25	20	30	26	E	E	E	E	
16	A	1.9	E	E	E	E			30	34	50	38	33	33	30	25	20	20	26	E	E	E	E	E	
17	A	2.5	E	E	E	E			32	33	33	36	34	31	24	26	20	26	E	E	E	E	E	E	
18	E	E	E	E	E	E			31	41	37	37	33	33	32	26	26	22	17	E	E	E	E	E	
19	E	E	E	E	E	E			4	32	34	34	33	33	32	26	C	21	42	A	A	A	E	E	
20	A	2.1	E	E	E	E			2/4	33	33	34	35	40	30	26	23	17	38	29	A	E	E	A	
21	27	1.8	1.9	E	E	E				304	304	304	304	234	C	C	25			E	28	24			
22	27	1.8	1.9	E	E	E			28	294	C	35	34	34	29	32	32	E	E	E	E	E	E	E	
23	E	E	E	E	E	E			429 <sup>B</sup>	254	244	244	27	234	29	18	18	E	E	E	24	24	25	24	
24	E	E	E	E	E	E						34	254	31	30	27	26	E	23	40	35	25	23	24	
25	2/1	2.3	E	E	E	E						34	28	30	31	30	26	20	17	E	E	E	E	E	
26	E	E	E	E	E	E				29	31	C	C	C	27	25	25	3.1	23	20	E	E	E	E	
27	E	E	E	E	E	E				29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	E	E	E	E	E			28	30	31	33	C	C	C				E	E	E	E	E	E	
29	A	2.6	2.6	3.0	2.0	E			26	30	32	35	34	34	21						20	20	E	E	
30	E	E	E	E	E	E				29	21	26	34				20	24	20	E	E	E	E	E	
31																									
No.	19	18	20	19	20	9	6	9	10	22	21	23	20	19	14	15	18	21	20	19	19	21	28	16	
Median	E	E	E	E	E	E	E	E	29	30	34	35	34	33	30	27	23	18	1.8	E	E	E	E	E	

fbEs

Lat. 39° 43.6' N  
Long. 140° 08.2' E

IONOSPHERIC DATA

Akita

135° E Mean Time (GMT.+ 9h.)

f-min

Nov. 1930

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	E	E	E	E	E	E	1.65	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
2	E	E	E	E	E	E	E	1.70	1.75	1.80	2.00	2.00	2.00	1.80	1.80	1.75	1.65	E	E	E	E	E	E	E
3	E	E	E	E	E	E	E	1.65	1.75	1.85	1.75	1.70	1.70	1.75	1.80	1.70	1.65	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	1.65	1.70	1.80	2.00	2.00	1.70	1.75	1.65	1.75	1.80	E	E	E	E	E	E	E
5	E	E	E	E	E	E	E	1.65	1.75	1.80	1.80	1.80	1.80	1.80	1.70	1.70	1.80	E	E	E	E	E	E	E
6	E	E	E	E	E	E	E	1.65	1.70	1.80	1.80	1.90	1.90	1.90	1.70	1.70	1.80	E	E	E	E	E	E	E
7	E	E	E	E	E	E	E	1.70	1.85	1.70	1.95	1.90	1.80	1.95	1.85	1.70	1.70	E	E	E	E	E	E	E
8	E	E	E	E	E	E	E	1.65	1.70	1.80	1.75	1.90	1.80	1.75	1.70	1.70	1.65	E	E	E	E	E	E	E
9	E	E	E	E	E	E	E	1.65	1.70	1.80	1.90	2.00	2.00	2.00	1.90	1.70	1.70	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E	1.75	1.90	2.10	2.45	2.20	2.00	1.80	2.00	1.80	1.80	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	1.75	1.85	1.95	2.00	2.30	2.55	5.50	3.55	2.00	1.70	E	E	E	E	E	E	E
12	E	E	E	E	E	E	E	1.65	1.80	1.80	2.00	2.50	2.00	2.25	1.80	1.80	1.70	E	E	E	E	E	E	E
13	E	E	E	E	E	E	E	1.70	1.75	2.00	1.80	1.90	2.00	1.90	1.95	1.75	1.70	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	1.70	1.70	1.85	2.00	2.00	3.40	5.55	3.45	1.95	1.65	E	E	E	E	E	E	E
15	E	E	E	E	E	E	E	C	C	C	1.95	1.85	1.330	4.90	3.50	1.80	1.70	E	E	E	E	E	E	E
16	E	E	E	E	E	E	E	1.75	1.70	1.80	1.80	2.00	2.05	2.05	1.95	1.65	1.95	E	E	E	E	E	E	E
17	E	E	E	E	E	E	E	1.65	1.75	1.80	1.80	1.80	1.70	1.70	1.70	1.70	1.65	1.75	E	E	E	E	E	E
18	E	E	E	E	E	E	E	2.05	1.75	1.75	1.85	1.80	2.00	1.80	1.70	1.70	1.65	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E	E	1.70	1.80	1.80	1.95	1.85	1.80	1.90	1.80	C	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	E	1.65	1.65	1.70	1.80	1.70	1.70	1.70	1.70	1.65	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	1.75	2.00	2.50	2.00	1.80	2.05	1.80	C	1.65	1.65	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	1.65	1.70	2.05	2.00	1.90	2.00	2.00	2.00	1.95	1.70	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	1.80	1.90	1.80	2.00	1.80	1.70	1.80	1.75	1.80	1.70	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	1.95	1.80	1.85	2.05	2.00	1.80	1.80	1.75	1.75	1.70	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	1.95	1.80	1.80	1.85	1.75	1.75	1.80	1.80	1.70	1.65	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	1.90	1.65	1.75	1.80	2.05	1.80	1.95	1.75	1.80	1.70	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	1.80	1.70	1.80	C	C	C	C	C	C	C	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	1.85	1.80 <sup>s</sup>	1.70	1.85	1.75	1.95 <sup>c</sup>	1.80	1.80 <sup>c</sup>	1.65	1.90	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	1.80	1.70	1.80	1.85	1.75	1.90	2.05	1.90	1.90	2.20	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	1.85	1.70	1.85	1.75	1.80	1.75	2.05	1.80	1.85	1.65	E	E	E	E	E	E	E
31																								
No.	29	30	29	29	29	29	28	29	28	28	28	28	28	28	27	27	27	29	28	28	29	29	28	29
Median	E	E	E	E	E	E	E	1.70	1.75	1.80	1.85	1.90	1.90	1.80	1.80	1.75	1.70	E	E	E	E	E	E	E

Sweep 1.62 Mc to 2.62 Mc in 20<sup>min</sup> sec in automatic operation.

The Radio Research Laboratory, Japan.

A 6

f-min

IONOSPHERIC DATA

Lat. 39° 43.6' N  
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT. + 9h.)

(M3000)F2

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	270	250	270	270	265	250	290	320	C	C	C	C	C	C	C	C	C	335	310A	285	315	280	270	265
2	305	285	280	275	280	280	305	330	315	315	325	320	315	310	315	325	330	335	295	285	280	265	260	275
3	270	290	310	295	270	305	325	345	345	310	310	310	320	315	315	320	335	325	300	295	280	255	255	275
4	280	285	300	290	280	300	340	335K	330	310	310	310	345	300H	305	320	315	300	280	285	300	270	275	290
5	290	295	245	250	265	290	300	325K	335	315	315H	310	305	305	310	325	325	325	325	300	290	275	295	300
6	255	260	265	285	305	295	295	325	335	325	315	315	320	310	315	325	330	305	300	320	315	300	290A	270
7	245	295	305	285	280	265	310	350K	330	330	325	315	315	305	315	325	325	300	315	320	315	310	250	265
8	260	280	285	300	315	305	290	325	330	320	335	315	310	320	320	315	325	310	335	325	300	320	275	275
9	260	250	270	280	280	310	300	340	340	340	305V	310	315	305	310	320	325	310	300	315	300	295	265	265
10	255	280	280	315	260	270	310	345	335	340	315	310	300	310H	325	315	335	325	320	315	300	290	260	260
11	250	265	275	290	265	255	295	320	320	320	315H	305H	315H	305	305	315	310	310	290	305	305	260	245	250
12	295A	315	245	235	235	260	285	340K	330	330	305H	305H	305H	280H	275	285	280	230H	230H	250	300	295	F	F
13	275	260	245	265	225	230	290	330	290	265H	305	315	300	310	320	335	325	315	330	325	315	1280F	1310S	280
14	F	F	F	F	F	F	F	305F	320	335E	315	315	330	310	320	320	345	340	1320A	305	1320A	1290K	300	310
15	265	250	280	C	C	C	C	C	C	C	330	330K	315E	310	320K	320H	345	340	1320A	305	1320A	1290K	300	310
16	1240A	220	235	220	230	230	275	310K	320	310	325	285H	300K	275	295	305	305K	305	260	275	290	300F	320	290
17	250	235	260	240	305	310	280	340	335	320H	320	325	320	315	335	325	340K	335	305	290	315	280	275	265
18	250	275	265	260	1260F	280	320K	355	340	335	335	325	320H	325	320	325	355	305	345	290H	300	260H	270	285
19	275	300	275	270F	270	270	295	335	350	320	330	340	320	340	330	340	345C	330	320	A	A	A	260	270
20	270A	280	275	285	300	265	295	345	340	320	330	320	320	325	315	330	340	310	350	345	1320A	305	270	1270A
21	1280F	F	F	F	285	275	295	330	330	330	340	325	315	325	C	C	325	320	315	350	310	270	260	1260K
22	240	240	250	230	220F	265	255	310	320K	305	315C	310	330	325	330	345	340	330	310	320	300	295	295	315
23	245	255	250F	255	250	270	320	355	350	335	340	340	335	340	350	340	350	315	295	320	310	300	270	270
24	280	270	270	275	285	300	330	350	350K	340	330	330	325	335	325	340	345	300	320	330	345	320	275	275
25	270	270	270	A	A	260	290	330K	345	330	325	335	320	330	340	335	350	340	340	340	305	265	270	290
26	330	320	245	240	245	260	280	340	320	320	330	335	335	320	340	335	350	340	320	300	270	310	270	290
27	290	295	310	305	250	285	305	325	330K	335	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	270	260	270	300	285	1280C	345	335K	325K	340	330	1330C	335	1345C	350	340	335	310	1320C	350	265	275	260
29	1280A	260	285	290	270	285	300	345K	355	340	340	340K	340	350	340	335	340	340	315	330	315	270	275	260
30	285	265	275	275	290	275	300	340	355	340	340	330H	345	340	330	340	345	325	335	320F	305	260	1260C	265
31																								
No.	28	28	28	26	27	28	28	29	28	28	28	28	28	28	28	27	28	29	29	28	27	27	28	28
Median	270	270	270	275	270	270	295	340	335	325	325	320	320	315	320	325	330	320	315	315	305	280	270	270

(M3000)F2

IONOSPHERIC DATA

Lat. 39° 43.5' N  
Long. 140° 08.3' E

Akita

135° E Mean Time (GMT.+9h.)

(M3000)F1

Nov. 1960

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	C	C	C								
2																									
3										L	L	L	L	L	L										
4																									
5																									
6																									
7																									
8										L	L														
9																									
10																									
11																									
12																									
13																									
14																									
15									C		L	B													
16																									
17																									
18																									
19										420		L <sup>H</sup>													
20																									
21										L	C	L	L	L	C	C									
22											L														
23											L														
24																									
25													L												
26																									
27																									
28										C	C	C	C	C	C	C	C								
29										L	L	L	L	L	L	L	L								
30																									
31										L															
No.										/															
Median										420															

Sweep 160 Mc to 220 Mc in 20 sec in automatic operation. The Radio Research Laboratories, Japan.

A 8

# IONOSPHERIC DATA

Lat. 39° 43.6' N  
 Long. 140° 08.2' E

**A k i t a**

135° E Mean Time (GMT.+9h.)

R'F2

Nov. 1960

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	C	C	C									
2											245		245	L												
3													245	250												
4												245														
5													245													
6													245													
7													245													
8											245															
9											250L															
10																										
11																										
12																										
13																										
14																										
15									C			245	B													
16																										
17																										
18																										
19									230			245L														
20																										
21										L	215C	235	250	250												
22											245		245	245												
23																										
24																										
25													235													
26																										
27											C	C	C	C	C	C	C									
28											245	240	230C	245												
29											245	245	245L													
30										250L																
31																										
No.									2	7	6	8	8	4												
Median									240	245	245	245	245	250												

Sweep 160 Mc to 202 Mc in 2.0 sec <sup>min</sup> in automatic operation.

The Radio Research Laboratories, Japan.

**A 9**

R'F2

Lat. 39° 43.6' N  
Long. 140° 08.2' E

IONOSPHERIC DATA

Akita

135° E Mean Time (GMT.+9h.)

k'F

Nov. 1960

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	330	320	300	305	345	295	245	C	C	C	C	C	C	C	C	C	245	A	A	250	290	290	305	
2	255	280	290	300	290	295	250	245	245	235	245	245	240	230	245	240	225	215	240A	250A	245	245	300	305	
3	310	260	230	240	310	255	245	245	245	235	210	245	215	240	245	245	240	200	245	250	245	245	300	280	
4	290	245	260	260	280	255	245	240	245	235	235	215	245	245H	250	245	220	230	250	265	245	235	235	255	
5	255	255	350	340	300	235	285	240	245	235	245H	245	230	240	245	245	235	245	230	240	260	290A	245	245	
6	330	340	340	290	245	285	260	245	240	240	245	235	240	240	245	245	225	200	250	245	240	240A	270A	300A	
7	330	330	255	275	240	290	260	230	230	240	230H	245	235	245	245	235	225	220	240	245	240	300	300	325A	
8	310	290	280	260	245	255	245	245	240	240	230	240	245	245	245	235	240	215	245	235	245	245	290	295	
9	320	330	330	305	275	250	240H	245	230	245	235	245	245	245	245	245	235	210	240	245	240	255	290	305	
10	340	300	295	260	290	300	245	240	240	245	245	245	245	245H	245	245	240	210	240A	245A	250A	240	340		
11	350	335	305	270	260	315	260	245	240	245	245	240H	235H	240B	245	250	220	230	245	245	220	230	350	345	
12	280A	245	290A	350	350	345	295	250	245	245	240H	245	240	245	245	240	235	215	245	230	245	255	300	305	
13	300A	340	360	310	390	400	250	210	240	270H	230	245	245H	245	245	255	260	345	350	340	235	220F	340	250	
14	340	390E	320	290F	290F	400	270	235	235	235	235	245	245	245B	245	240	225	220	230	240	240	300	240	255	
15	300	340	290	C	C	C	C	C	C	C	240	240	245	245	220	240	235	235	220A	250A	240A	250A	245	245	
16	350A	365A	400	390	345	295	240	220	245	245	245H	245	245	245	245	245	220	245	300A	295	260	245	240	250	
17	300	345A	320	290	255	245	260	245	225	220H	240	245	230	245	245	245	230	225	245	240	240	255	270	300	
18	320	310	350	340	340	290	250	230	220H	245	245	245	240H	245	240	245	230	205	245	205	240	235	330	245	
19	290	260	300	310A	320	300	250	245	225	205	240	205H	235	245	245	240	230	205	A	A	A	340	345		
20	335A	330A	300	320	275	305	255	240	220	245	245	240	245	245	245	245	225	210	240A	A	A	240	245		
21	300	340	305	290	290	295A	280	245	240	245	245	240	240	245	C	C	245	205	255	225	235A	280A	300	350	
22	355A	325	365A	390E	455	330E	350	265A	260	250	245C	245	230	240	240	240	225	205	245	245	245	250	255	245	
23	330	325	305	340	350	300	245	210	205H	245	210	240	240	210	220H	245	205	205	285	240	240	250A	280A	300	
24	300	285	300	305	290	290	250	245	215	240	240	240	240	245	235	230	210	225	250	250A	A	A	A	A	
25	A	A	340	A	A	A	270	245	220	245	245H	240	200	240	245	245	245	205	240	240	240	325	320	245	
26	230	245	350E	390E	390	340	290	245	245	225	230	245	245	210H	235H	235	210	240A	240A	250A	240	260	290	290	
27	270	290	255	250	330E	290	255	250	240	240	240	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	290	335	305	285	270	265C	220	240	245	225	215	205C	205	240C	225	215	205	215	240C	225	340	300	270	
29	295A	300A	295A	270A	305A	290	270	245	215	240	220	240	210	240	235H	215	225	205	235	220	250	280A	240	330	
30	290	315	300A	295	290	290	270	245	245	240	245	235	220	205H	240	230	230	240	240	200	240	260	245C	325	
31																									
No.	28	28	29	26	27	27	29	29	28	28	28	28	28	28	29	27	28	29	27	26	27	27	28	28	
Median	300	310	305	300	290	290	260	245	240	240	245	245	240	245	245	245	225	215	240	245	245	255	240	300	

The Radio Research Laboratories, Japan.

Sweep 1.60 Mc to 2.00 Mc in 2.0 sec

k'F

Nov. 1960

A 10

IONOSPHERIC DATA

Lat. 39° 43.5' N  
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT.+9h.)

Nov. 1960

f<sub>o</sub>F<sub>2</sub>

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	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	105	105	105	105	105	100	105
2	105	100	100	100	100	105	E	E	E	E	105	105	105	105	105	105	105	105	105	100	100	E	100	100
3	E	E	E	E	E	E	E	E	E	130	130	130	125	105	105	105	105	E	E	E	E	105	105	E
4	E	E	100	100	E	E	E	145	E	145	140	145	150	E	E	E	150	105	105	105	105	105	105	100
5	105	105	E	105	105	E	E	E	E	130	145	145	150	E	E	E	140	110	110	110	110	110	105	105
6	105	105	105	110	105	E	E	150	145	145	E	E	E	140	E	E	E	E	E	E	110	105	105	105
7	105	105	105	105	100	E	E	E	E	115	E	105	105	105	E	145	E	105	105	105	105	100	100	100
8	100	E	100	100	105	E	E	115	110	105	105	105	100	100	100	130	100	100	100	100	105	105	E	E
9	E	E	E	E	E	E	E	E	E	E	145	145	125	130	105	105	105	100	105	105	100	100	105	E
10	E	E	E	E	E	105	E	E	E	E	110	105	105	105	E	105	105	105	105	105	105	105	100	100
11	100	100	100	E	100	E	E	E	E	145	E	E	110	B	B	105	E	E	E	E	E	E	105	100
12	100	100	100	100	100	100	E	E	120	120	125	125	E	110	105	100	105	110	110	110	110	E	110	105
13	105	105	E	E	105	E	E	145	145	135	140	130	E	120	135	E	E	E	E	E	E	E	145	145
14	105	145	145	135	145	E	E	170	135	125	120	110	115	B	B	E	105	100	115	105	105	105	105	105
15	100	110	100	C	C	C	C	C	C	C	105	105	B	B	B	105	105	110	110	105	105	105	105	105
16	105	105	105	E	E	E	145	140	110	110	105	105	110	110	110	E	E	110	110	105	115	105	105	E
17	E	105	105	105	105	E	E	E	E	145	135	115	125	E	100	100	110	105	100	100	100	105	105	E
18	E	E	105	105	105	E	E	E	E	110	105	105	105	105	105	100	100	100	100	100	100	100	110	E
19	E	E	105	100	105	E	E	E	E	120	110	110	105	105	105	110	100	115	110	105	105	105	105	E
20	100	100	105	105	105	105	105	105	105	130	105	105	105	105	105	105	105	105	110	105	105	105	105	105
21	E	E	E	105	105	105	E	E	E	E	E	105	105	105	105	105	105	E	E	E	110	105	105	105
22	105	105	105	E	E	E	E	E	110	110	105	110	E	140	E	C	105	E	E	110	105	105	E	E
23	105	105	E	E	E	E	E	110	110	105	105	105	105	105	105	105	140	120	105	105	105	105	105	E
24	105	105	E	105	100	E	105	E	E	105	105	105	105	105	105	105	105	100	100	100	100	105	105	105
25	105	100	100	100	100	100	105	E	E	E	E	105	110	105	105	105	100	110	115	105	105	105	100	105
26	105	105	105	105	105	E	E	E	E	110	110	E	E	E	105	105	100	100	100	100	100	100	100	E
27	E	E	E	E	E	E	100	E	E	115	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	E	105	105	105	105	C	E	115	110	115	115	C	E	C	E	E	E	115	C	E	E	E	105
29	100	105	105	105	105	105	105	E	E	135	115	120	120	125	100	E	E	E	E	E	E	105	100	100
30	100	100	100	100	100	E	E	E	110	105	105	100	140	E	E	E	100	100	100	110	105	105	C	E
31																								
No.	19	18	20	19	20	9	6	9	10	22	21	23	20	19	14	15	18	21	20	19	19	21	23	16
Median	105	105	105	105	105	105	105	145	110	120	110	105	110	105	105	105	105	105	105	105	105	105	105	105

Sweep 4.00 Mc to 24.0 Mc in 2.0 sec in automatic operation.

The Radio Research Laboratories, Japan.

A 11

f<sub>o</sub>F<sub>2</sub>



# IONOSPHERIC DATA

Lat. 39° 43.5' N  
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT.+9h.)

Types of Es

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F	F	F	F	F	F																			
2	F	F	F	F	F	F																			
3	F	F	F	F	F	F																			
4	F	F	F	F	F	F																			
5	F	F	F	F	F	F																			
6	F	F	F	F	F	F																			
7	F	F	F	F	F	F																			
8	F	F	F	F	F	F																			
9	F	F	F	F	F	F																			
10	F	F	F	F	F	F																			
11	F	F	F	F	F	F																			
12	F	F	F	F	F	F																			
13	F	F	F	F	F	F																			
14	F	F	F	F	F	F																			
15	F	F	F	F	F	F																			
16	F	F	F	F	F	F																			
17	F	F	F	F	F	F																			
18	F	F	F	F	F	F																			
19	F	F	F	F	F	F																			
20	F	F	F	F	F	F																			
21	F	F	F	F	F	F																			
22	F	F	F	F	F	F																			
23	F	F	F	F	F	F																			
24	F	F	F	F	F	F																			
25	F	F	F	F	F	F																			
26	F	F	F	F	F	F																			
27	F	F	F	F	F	F																			
28	F	F	F	F	F	F																			
29	F	F	F	F	F	F																			
30	F	F	F	F	F	F																			
31	F	F	F	F	F	F																			
No.																									
Median																									

Sweep  $\angle$  60 Mc to 240 Mc in 20 <sup>min</sup> sec in automatic operation.

Types of Es

The Radio Research Laboratories, Japan.

A 14

# IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 28.3' E

## Kokubunji Tokyo

135° E Mean Time (GMT. + 9h.)

Nov. 1960

foF2

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	3.8	3.9 <sup>s</sup>	4.0 <sup>s</sup>	3.7	3.3	4.6 <sup>s</sup>	7.0 <sup>s</sup>	7.0 <sup>s</sup>	7.0 <sup>s</sup>	10.2 <sup>s</sup>	12.1	13.1	12.5	12.2	11.2	10.4 <sup>s</sup>	9.2	8.7	5.8	5.2 <sup>A</sup>	5.3	4.5	4.1	4.3	
2	4.4	3.7	3.7	3.5	3.4 <sup>s</sup>	4.9	8.7	8.7	11.4	12.7	13.0	13.0	12.1	12.3	12.6	11.4	9.7 <sup>s</sup>	7.7	5.4	4.5	5.1 <sup>s</sup>	4.6 <sup>s</sup>	4.4	4.4	
3	4.6	5.1	4.0 <sup>s</sup>	3.3 <sup>s</sup>	2.8	3.4	5.0 <sup>s</sup>	8.4	11.0 <sup>s</sup>	11.5	12.2	13.9	13.1	14.1 <sup>s</sup>	13.6	12.2	11.6	8.6	6.0	6.1	7.4 <sup>s</sup>	5.4	5.4	5.6	
4	5.3	5.2 <sup>s</sup>	5.2	4.4 <sup>s</sup>	3.8	3.8	5.1	8.4	10.5 <sup>s</sup>	11.6	11.7	12.5 <sup>s</sup>	12.4	13.1	13.9 <sup>s</sup>	12.4	10.6 <sup>s</sup>	8.8	7.0	7.4 <sup>s</sup>	7.2	5.9	5.9	5.5	
5	5.4	4.7	4.3 <sup>s</sup>	4.3 <sup>s</sup>	4.5 <sup>s</sup>	4.8	5.9 <sup>s</sup>	9.8 <sup>s</sup>	11.8	12.7	13.1	13.1	12.5	12.3	11.5	10.8	9.8	8.5	7.6	5.7	5.2	5.0	4.9	4.4	
6	3.9	4.1	4.0	4.4	3.8 <sup>s</sup>	3.8 <sup>s</sup>	5.5	11.0 <sup>s</sup>	10.8	12.2	13.7	12.9	11.3 <sup>s</sup>	11.2	11.2	11.7	9.6	8.2	6.3	6.9	5.9	4.2	3.9 <sup>s</sup>	3.6 <sup>s</sup>	
7	3.7	4.1	4.6	3.6	3.6	3.7 <sup>s</sup>	5.3	11.0 <sup>s</sup>	10.2	11.7	13.0	12.9	12.0	12.8	12.7	11.3	10.0	8.3	7.2	6.3	7.5 <sup>s</sup>	4.8	4.0	4.1 <sup>s</sup>	
8	4.3	4.3 <sup>s</sup>	4.4	4.6 <sup>s</sup>	4.1	3.2	4.8	8.8 <sup>s</sup>	11.5	12.6	11.6	12.9	13.0	13.0	12.2	11.4	8.9	8.0	6.6	6.3 <sup>s</sup>	5.0 <sup>s</sup>	4.3 <sup>A</sup>	3.6	3.6	
9	3.6	3.5 <sup>s</sup>	3.6 <sup>s</sup>	3.6	4.1 <sup>s</sup>	3.6 <sup>s</sup>	4.5 <sup>s</sup>	7.9 <sup>s</sup>	10.8	10.6	11.1	12.1 <sup>s</sup>	13.3	12.9	12.9	12.8	11.1	8.9	6.7	5.8	6.1	5.6	4.4	3.9	
10	3.8 <sup>s</sup>	3.8 <sup>s</sup>	4.1	3.9	3.1 <sup>s</sup>	3.2 <sup>s</sup>	5.0	8.4	10.1 <sup>s</sup>	10.8 <sup>s</sup>	11.3	11.8	11.9	12.3 <sup>s</sup>	12.9	11.7	10.8	8.8	6.3	C	C	C	3.6	3.5	
11	3.6	3.9	4.1	4.1	3.2 <sup>s</sup>	3.4 <sup>s</sup>	4.7	C	C	12.4	13.1	13.4	13.5	13.7	12.7	12.0	11.0	8.7	7.6	6.9	6.3	4.3	4.4	4.4	
12	5.5	3.6	3.1	3.2	3.3	3.4	4.9 <sup>s</sup>	9.8 <sup>s</sup>	10.9	12.1	12.4	12.8	12.6	12.8	12.8	12.2	11.3	9.0	8.1	6.8	5.1	4.1	3.5	3.5	
13	3.7	3.4	3.4	3.4 <sup>s</sup>	3.0	2.5 <sup>s</sup>	4.7 <sup>s</sup>	7.4	7.8	13.7	8.6	14.7 <sup>s</sup>	13.8	13.9	12.4	11.2	11.7	10.5	12.2	13.7	13.6	11.9	9.1 <sup>s</sup>	14.1 <sup>F</sup>	
14	9.9 <sup>s</sup>	A	6.3 <sup>s</sup>	F	FS	5.1 <sup>F</sup>	6.9 <sup>F</sup>	9.4 <sup>F</sup>	13.1 <sup>F</sup>	14.7 <sup>s</sup>	12.8	12.9	12.5	12.8	11.4	10.9	10.2	9.3	7.9	5.3	4.6	4.5	4.2	A	
15	A	3.8	4.0	3.5	2.9	3.1	3.9	9.5 <sup>s</sup>	10.8	11.8	14.6 <sup>s</sup>	13.6	R	14.2 <sup>s</sup>	13.9 <sup>s</sup>	11.5 <sup>s</sup>	9.3 <sup>s</sup>	8.3	7.7	5.1	5.0	4.2 <sup>s</sup>	3.3	2.5	
16	2.4	3.1 <sup>F</sup>	3.0 <sup>s</sup>	2.7 <sup>F</sup>	3.3 <sup>s</sup>	3.1 <sup>s</sup>	4.3 <sup>s</sup>	7.8 <sup>s</sup>	10.8	12.8	14.1 <sup>s</sup>	13.8 <sup>s</sup>	15.1 <sup>s</sup>	11.0	12.4	13.9 <sup>s</sup>	12.3	8.6	6.8	7.7 <sup>s</sup>	8.1 <sup>s</sup>	8.4 <sup>s</sup>	6.5	3.7	
17	3.3	3.4	3.7	3.3	3.3	A	3.8 <sup>s</sup>	7.8 <sup>s</sup>	11.8	11.0	13.5	13.6 <sup>s</sup>	12.8 <sup>s</sup>	11.5	11.6	11.2	9.9 <sup>s</sup>	7.3 <sup>s</sup>	5.7 <sup>s</sup>	6.0	7.5 <sup>s</sup>	3.5	3.3	3.2	
18	3.2	3.4	3.1	3.4	3.1	3.3	4.7 <sup>s</sup>	7.7 <sup>s</sup>	8.9	10.8	11.4	12.3	12.9	12.6	11.4	11.2	11.1 <sup>s</sup>	6.8	4.9	4.6	3.9 <sup>s</sup>	4.1	3.3	3.6	
19	3.2	3.2	3.0	3.0	2.9	3.2	4.3 <sup>s</sup>	8.2 <sup>s</sup>	9.9 <sup>s</sup>	11.1	11.3	12.0	12.0	12.4 <sup>s</sup>	11.1	10.3 <sup>s</sup>	8.4	6.3	4.4	5.0	3.6	3.5	3.1	3.2	
20	3.3	3.4	3.2 <sup>s</sup>	3.3 <sup>s</sup>	3.3	3.2	4.1 <sup>s</sup>	7.3 <sup>s</sup>	9.1	10.9	12.1	12.6	11.8	12.3	11.6	10.3	9.4	6.1	5.4 <sup>s</sup>	4.2 <sup>A</sup>	3.1	4.2	4.1 <sup>A</sup>	3.2	
21	3.4 <sup>A</sup>	3.4	3.6	3.7	3.7	3.8 <sup>s</sup>	4.4 <sup>s</sup>	8.0	11.1	12.2	11.7	11.3	11.1	12.9	11.5	9.2	8.8	8.7	6.7	5.8	3.6	3.5	3.3	3.6	
22	3.4	3.7	3.4 <sup>A</sup>	3.1	3.0	2.9 <sup>s</sup>	3.0	7.6	11.1	11.8	14.2 <sup>s</sup>	4.3 <sup>s</sup>	12.2	11.7	11.1	10.4	10.3	8.7 <sup>s</sup>	5.0	4.5	3.9	4.1	3.9	3.0	
23	2.9	2.8	3.1 <sup>s</sup>	2.9 <sup>s</sup>	3.1	3.2 <sup>s</sup>	4.6	9.3 <sup>s</sup>	8.1	10.6	13.0	13.0	11.9	11.6	10.0 <sup>s</sup>	9.3 <sup>s</sup>	8.6	5.2	4.0	4.8	4.2 <sup>s</sup>	3.6 <sup>s</sup>	2.7	3.1	
24	3.3 <sup>s</sup>	3.2	3.3 <sup>s</sup>	3.3	3.4 <sup>s</sup>	3.4 <sup>s</sup>	4.5 <sup>s</sup>	8.3 <sup>s</sup>	10.1 <sup>s</sup>	11.4	12.3	13.2	12.5	11.5	9.3	9.0	8.7	5.1	5.1	5.2 <sup>s</sup>	4.6	3.3	2.6	3.0	
25	3.2	3.2 <sup>A</sup>	3.4	3.3 <sup>A</sup>	3.1	3.2	4.1 <sup>s</sup>	8.0 <sup>s</sup>	9.4	9.9	11.9	13.2	12.2	10.4 <sup>s</sup>	9.3	9.8 <sup>s</sup>	11.3	8.9	5.6	4.0	3.6	4.0	3.8 <sup>s</sup>	5.2	
26	3.2	2.6 <sup>A</sup>	2.5	2.5 <sup>A</sup>	2.6	2.5	3.4	7.4 <sup>s</sup>	10.8	14.0 <sup>s</sup>	13.5	12.7	11.7	12.2 <sup>s</sup>	12.0	11.0	9.0	6.4	4.8	4.1	3.8	3.8 <sup>s</sup>	3.7	3.5	
27	3.1	3.1	3.2	2.6	2.3	2.5 <sup>s</sup>	3.2	7.1	11.3	11.5	11.2	11.3	11.4	12.1	11.1	9.7 <sup>s</sup>	8.2	6.6	6.2	5.0	3.7	2.5	2.8	3.1	
28	3.1	3.3	3.2	3.5	3.6	2.8	3.2	7.1	9.1	11.7	13.3	14.2	11.6	11.1	11.3	7.9 <sup>s</sup>	9.1	6.4	4.4	4.4	4.1	3.4	3.4	3.5	
29	3.7	3.6	3.8	3.6	3.0	3.2	3.8	8.0 <sup>s</sup>	10.7 <sup>s</sup>	10.7 <sup>s</sup>	12.7	12.8	11.3	10.4	9.3	8.4	7.7 <sup>s</sup>	7.1	4.3	4.5	3.2	3.0	3.0	3.0	
30	3.2	3.0	3.2	3.1	3.1	3.1	3.5	7.6 <sup>s</sup>	9.0	9.5	13.1	11.2	9.3	9.6	9.2 <sup>s</sup>	8.6	7.8 <sup>s</sup>	6.4	6.1	4.2	3.2	3.3	3.3	3.4	
31																									
No.	2.9	2.9	3.0	2.9	2.9	2.9	3.0	3.0	2.9	3.0	3.0	3.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	3.0	2.9	
Median	3.6	3.5	3.6	3.5	3.2	3.2	4.6	8.2	10.8	11.6	12.8	12.9	12.2	12.3	11.6	11.0	9.8	8.2	6.2	5.2	5.0	4.2	3.8	3.6	
U.L.Q.	4.1	3.9	4.0	3.8	3.6	3.5	4.9	9.4	11.1	12.4	13.3	13.4	12.8	12.9	12.7	11.7	11.0	8.7	7.0	6.3	5.6	4.6	4.4	4.2	
L.Q.	3.2	3.2	3.2	3.2	3.0	3.1	3.9	7.6	9.3	10.8	11.7	12.5	11.8	11.5	11.1	9.9	8.9	6.6	5.1	4.5	3.8	3.5	3.3	3.2	
Q.R.	0.9	0.7	0.8	0.6	0.6	0.4	1.0	1.8	1.8	1.6	1.6	0.9	1.0	1.4	1.6	1.8	2.1	2.1	1.9	1.8	1.1	1.1	1.1	1.0	

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 2.0 Mc in 2.0 <sup>min</sup> sec in automatic operation.

foF2

K 1

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

135° E Mean Time (GM.T. + 9h.)

foF1

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L		L	L	L											
2										L	L	L	L	L	L									
3										L	L	L	L	L	L									
4											L	L	L	L	L									
5											L	L	L	L	L									
6																								
7											L	L	L											
8										L	L	L	L											
9											C													
10																								
11								C	C				L	B										
12											L													
13										L	L													
14										A	A	A	B	B										
15										A	S	A	S	A										
16																								
17													A											
18										L	L													
19																								
20																								
21																								
22										S	A	A	S	A										
23										A	L	A	L											
24																								
25										L	L	L												
26										L	L	L	L	L										
27										L	L	L	L	L										
28										L	L	L	L	L										
29																								
30																								
31																								
No.																								
Median																								

Sweep  $\frac{\Delta}{\Delta}$  Mc to  $Z\Delta$  Mc in  $Z\Delta$  sec in automatic operation.

The Radio Research Laboratories, Japan.

foF1

K 2

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 28.3' E

Kokubunji Tokyo

135° E Mean Time (GMT. + 9h.)

foE

Nov. 1960

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	B	2.75	2.95 <sup>S</sup>	3.25	A	A	A	A	A	A	A							
2							B	2.25 <sup>S</sup>	2.60	3.05	3.25	3.35	3.30 <sup>S</sup>	3.15	A	A	A	A							
3							S	2.55 <sup>A</sup>	3.15	3.45	3.50	3.45	3.35	3.10 <sup>A</sup>	2.60 <sup>S</sup>	2.10									
4							S	2.30 <sup>S</sup>	2.65	3.05	3.40	A	3.40 <sup>S</sup>	3.05	2.75 <sup>S</sup>										
5							S	2.40 <sup>S</sup>	2.70 <sup>A</sup>	3.05	3.30	3.55	3.30	3.30 <sup>S</sup>	3.00	2.70	B	S							
6							1.70	2.45 <sup>S</sup>	2.85	3.10 <sup>S</sup>	3.50 <sup>S</sup>	3.50	3.40 <sup>S</sup>	3.20	3.05	2.75 <sup>S</sup>	2.30								
7							B	2.35 <sup>S</sup>	2.95	A	A	3.40	A	A	A	A	B	A							
8							S	2.50 <sup>S</sup>	2.85	3.20 <sup>S</sup>	3.50 <sup>S</sup>	3.55	3.50	A	A	A	A								
9							S	2.80 <sup>S</sup>	3.15	3.30	3.40 <sup>C</sup>	3.40	A	A	A	A	A	B							
10							S	B	2.70	3.20	3.35	A	A	A	A	A	A								
11							S	C	C	A	3.50 <sup>S</sup>	3.50 <sup>A</sup>	R	B	B	S	2.20 <sup>S</sup>	B							
12							B	2.40 <sup>S</sup>	2.70	A	A	A	A	R	A	2.70 <sup>S</sup>	2.20 <sup>S</sup>								
13							B	2.25	2.60	3.10 <sup>A</sup>	3.25 <sup>A</sup>	3.35 <sup>A</sup>	A	A	A	A	S	1.70			1.85				
14							S	2.10 <sup>S</sup>	2.70	3.10	3.15 <sup>A</sup>	3.50 <sup>A</sup>	3.35	B	A	2.80	S	S							
15							S	A	A	A	3.30 <sup>S</sup>	B	B	B	A	A	B	B							
16							S	S	2.30 <sup>A</sup>	A	A	A	A	A	A	2.65	A	S							
17							S	S	2.75	2.95	3.25	3.25	3.30 <sup>A</sup>	A	2.90	A	A								
18							S	S	A	A	A	A	A	A	A	A	A	A							
19							E	2.20 <sup>H</sup>	A	A	A	3.30 <sup>A</sup>	3.25	3.25 <sup>R</sup>	A	A	A								
20							1.35	2.05 <sup>S</sup>	2.45 <sup>A</sup>	3.05	3.25 <sup>A</sup>	3.30 <sup>A</sup>	3.20	3.20 <sup>A</sup>	3.30 <sup>A</sup>										
21							S	2.30 <sup>S</sup>	2.85 <sup>S</sup>	3.25 <sup>S</sup>	3.35	3.40 <sup>A</sup>	3.45 <sup>A</sup>	3.25	3.05	2.60	A	S							
22							S	S	2.40	2.60	A	A	3.15 <sup>A</sup>	2.85	2.55 <sup>A</sup>										
23							S	S	2.10	A	A	A	3.15 <sup>S</sup>	3.00 <sup>A</sup>	A	A	S	B							
24							S	S	A	3.00	3.15 <sup>A</sup>	3.25	3.25	A	A	A	A	A							
25							S	S	2.45	3.00	R	A	A	A	A	A	A	B							
26							S	2.50 <sup>A</sup>	A	A	A	A	A	2.90	A	A	A								
27							S	2.50 <sup>A</sup>	2.90	A	A	A	A	3.10 <sup>A</sup>	2.90	2.45	A								
28							S	2.40 <sup>S</sup>	A	A	A	A	A	A	A	2.40 <sup>S</sup>	2.00 <sup>S</sup>								
29							2.10	2.35	2.80	3.10	3.05 <sup>A</sup>	3.10 <sup>A</sup>	3.00 <sup>A</sup>	2.60 <sup>A</sup>	2.45 <sup>A</sup>										
30							S	S	2.50	2.80	3.10	3.25	3.20	3.05	A	A	B								
31																									
No.							Z	14	24	20	18	18	15	14	10	13	5	1							
Median							1.50	2.30	2.60	3.05	3.30	3.40	3.30	3.20	3.00	2.65	2.20	1.70							

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 2.0 Mc in 2.0 Mc in 2.0 Sec in automatic operation.

foE

K 3

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 28.3' E

Kokubunji Tokyo

135° E Mean Time (GMT.+9h.)

foEs

Nov. 1960

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	730	727	E	E	1.1	B	S	B	3.4	3.4	G	3.4	738	3.6	737	740	794	741	758	780	730	731	733	730	
2	S	E	1.6	719	E	S	B	S	3.0	3.6	3.75	G	3.05	G	730	2.8	2.4	728	729	S	725	2.4	3.4	71.8	
3	720	S	E	E	S	S	S	S	3.4	G	G	G	740	G	740	G	G	S	2.6	S	S	S	S	72.4	
4	S	E	71.6	723	2.2	S	S	S	G	G	G	3.9	3.6	3.35	G	3.3	S	722	S	S	S	E	7.1	72.9	
5	2.5	717	1.3	E	S	S	S	S	2.7	G	3.9	3.7	3.6	G	G	3.6	730	737	750	71.9	2.15	73.8	73.8	72.9	
6	S	S	72.4	1.4	E	S	G	G	3.3	2.95	3.25	G	G	G	G	G	G	S	S	S	S	S	7.2	72.6	
7	72.6	726	730	2.4	717	2.2	B	S	G	3.3	4.0	3.45	4.0	4.0	3.9	72.9	B	733	75.0	72.7	72.9	2.1	7.2	E	
8	S	S	2.0	1.3	1.4	2.1	S	S	2.65	G	G	4.0	4.0	4.5	740	744	6.3	72.6	73.2	76.5	5.5	76.3	3.5	72.0	
9	2.1	S	S	1.9	1.9	S	S	S	G	G	4.3	C	4.5	4.6	3.8	3.6	2.8	72.2	75.3	76.4	7.4	71.8	S	E	
10	S	E	S	E	E	S	S	B	G	G	3.7	3.9	3.8	3.8	3.9	73.4	2.8	72.9	73.2	C	C	C	3.3	72.8	
11	S	S	E	E	E	S	S	C	C	3.3	G	3.9	G	B	B	2.7	S	B	S	E	S	S	3.3	72.8	
12	S	E	72.0	71.8	E	E	B	G	3.1	3.2	3.9	3.5	3.9	3.35	3.4	2.5	B	S	S	S	E	S	E	2.2	
13	72.7	71.8	72.2	71.8	72.5	E	B	G	3.4	74.9	74.9	4.2	3.9	3.4	3.1	3.0	S	G	S	S	E	2.8	72.1	2.4	
14	74.1	75.3	2.3	E	72.0	S	S	S	3.1	3.8	78.6	8.8	7.60	B	B	4.0	G	S	2.3	E	S	7.5	1.6	5.1	7.5
15	78.1	75.1	73.0	2.8	1.3	S	S	72.8	2.9	72.2	3.8	G	B	B	73.3	73.9	B	B	72.4	2.2	S	7.5	1.6	5.1	7.5
16	S	S	73.3	E	E	S	S	S	3.7	78.4	74.2	7.1	4.5	5.3	73.5	3.6	73.6	S	7.3	S	72.4	7.3	7.0	S	S
17	S	S	2.2	72.6	E	3.3	2.9	S	G	G	3.5	G	3.4	4.6	3.1	73.5	4.4	72.9	75.3	S	E	2.2	E	2.3	
18	72.7	E	S	73.4	73.1	E	S	S	73.1	74.1	3.4	75.8	6.7	73.2	3.5	4.5	73.1	74.0	74	S	S	2.2	E	2.3	
19	72.7	E	E	E	E	E	S	S	73.4	G	3.8	3.9	G	G	74.0	3.0	S	S	7.3	S	S	2.2	E	2.3	
20	S	E	E	E	1.4	2.0	S	S	73.4	G	3.8	3.9	3.3	2.9	3.3	73.9	G	S	7.6	7.5	7.3	S	S	S	
21	750	72.6	S	S	2.2	S	S	S	B	B	7.4	3.9	7.5	7.7	G	G	3.0	7.3	S	S	7.1	7.9	7.6	7.4	
22	S	72.4	74.1	73.0	71.9	72.3	2.5	S	2.9	3.5	4.4	75.6	3.8	7.6	2.9	2.9	74.0	4.5	75.0	72.1	2.5	2.1	2.2	1.9	
23	S	E	E	E	1.3	S	S	2.3	73.1	75.5	3.5	7.5	3.2	3.9	73.3	73.7	2.1	2.4	2.2	S	S	2.1	2.2	1.9	
24	S	E	E	E	E	S	S	S	2.5	2.9	73.3	3.0	7.3	7.3	73.4	73.4	7.2	73.4	S	73.9	3.4	7.6	S	E	
25	E	75.4	73.4	72.5	E	S	S	S	2.7	G	G	3.2	7.3	7.3	73.2	73.2	7.3	74.0	73.1	7.2	7.2	7.2	E	7.1	
26	73.9	4.4	73.0	73.3	72.3	S	S	S	73.0	73.9	73.9	3.6	3.8	2.9	73.3	3.0	7.3	75.4	73.4	7.7	7.2	7.2	E	7.1	
27	S	S	E	71.5	71.6	S	S	S	2.9	3.2	3.2	3.5	3.1	7.3	2.6	G	7.3	7.4	S	S	7.3	E	7.1	7.1	
28	S	S	71.9	E	71.7	S	S	S	S	73.9	73.9	73.3	3.5	7.3	3.0	2.5	S	7.2	7.3	7.5	7.3	7.4	7.4	7.1	
29	72.3	72.5	71.7	S	E	S	2.2	G	2.7	3.5	3.9	3.4	4.0	3.7	3.3	G	2.8	7.5	7.3	S	7.7	7.3	S	S	
30	S	S	2.2	72.8	71.8	S	S	S	G	7.3	3.3	3.6	G	7.3	7.9	7.3	B	B	S	S	S	S	S	E	
31																									
No.	13	20	24	28	29	9	7	6	27	29	30	29	29	27	29	30	21	21	20	14	20	23	19	26	
Median	2.6	1.8	2.0	1.4	1.3	2.1	G	G	2.9	3.3	3.4	3.6	3.6	3.2	3.3	3.2	3.0	2.9	3.2	2.6	2.6	2.2	2.2	2.2	
U.Q.	4.0	2.6	2.7	2.4	1.9	2.2	2.5	2.3	3.1	3.8	3.9	4.0	4.0	3.9	3.8	3.6	3.8	3.8	5.0	5.3	3.1	2.8	3.4	2.8	
L.Q.	2.7	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	2.3	2.4	2.4	2.2	2.2	1.8	2.0	1.8	
Q.R.	1.8												0.8				1.5	1.4	2.6	3.1	0.9	1.0	1.4	1.0	

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 2.0 Mc in 2.0 min. sec in automatic operation.

foEs

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

135° E Mean Time (GMT. + 9h.)

Nov. 1960

fbEs

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	Z1	1.9			1.1	B	S	B	Z9	3.1		3.4	3.7	3.6	3.7 <sup>s</sup>	3.4	6.0	3.7	4.7	A	Z0	Z0	Z3	Z5
2	S	S	1.6	1.7		S	B	S	Z9	3.2	3.1 <sup>q</sup>		3.0		3.0	2.8	2.2	2.6	2.9	S	Z5	E	Z4	1.7
3	E	S	S			S	S	S	Z9						3.1		S	Z0	S	S	S	S	E	1.9
4	S	1.4	1.3	1.8	1.3	Z1	S	S	Z5 <sup>f</sup>			3.6	3.5	3.0 <sup>A</sup>		3.1	S	Z0	S	S	E	Z3	1.9	Z0
5	Z4	S	1.6	1.3		S	S	S	3.2	2.6 <sup>q</sup>	3.0 <sup>f</sup>	3.6	3.6			3.2	2.6	3.5 <sup>s</sup>	3.3	1.8	S	S	Z1	1.9
6	S	1.6	1.5	1.4	1.2	1.9	B	S	3.2	3.2	4.0	3.2 <sup>q</sup>	4.0	3.7	3.5	2.9	B	3.1	3.3	Z5	Z4	A	Z5	1.9
7	Z0	Z2	S	E	E	E	S	S	Z4 <sup>f</sup>	3.2	4.0	3.8	4.0	3.2	4.0	3.9	4.7	2.4	3.1	4.9	A	A	-S	
8	S	S	E	E	E	S	S	S		4.1	4.1	C	4.3	4.6	3.5	3.1	2.5	2.2	4.8	Z3	4.0	E	-S	
9	E	S	S	E	E	S	S	S				3.7	3.5	3.8	3.7	3.3	2.7	2.6	2.8	C	C	C	Z1	Z2
10	S	S	S			S	S	C	C	3.3		3.6		B	B	2.6 <sup>f</sup>	S	B	S	S	S	S	S	S
11	S	S	1.9	1.4		S	S	C	Z9	3.2	3.6	3.5	3.8	3.3 <sup>f</sup>	3.1	2.4 <sup>f</sup>	B	S	S	S	S	S	S	E
12	S	1.9	1.7	1.5	1.8		B	S	Z0	3.2	4.6	4.0	3.7	3.4	3.0	2.6	S	S	S	S	E	Z1	1.8	1.5
13	1.9	A	E	E	1.5	S	S	S	Z8	3.3	5.9	8.2	5.7	B	4.0		S	Z1	S	S	E	Z5	Z5	A
14	Z0	A	E	E	1.3	S	S	S	Z8	8.0	3.7		B	B	G	3.4	B	B	Z2	1.9	Z3	S	S	S
15	A	Z0	E	1.7		S	S	S	Z2	8.0	3.0 <sup>f</sup>	5.2	4.5 <sup>s</sup>	4.5	3.2	2.7	3.2	S	S	E	Z1	Z1	1.9	S
16	S	S	Z2	1.6	1.7	S	S	S	3.1	3.8	2.3	5.3	3.4	4.6	3.0	2.6	2.5	1.9	Z1	S	S	E	S	Z2
17	S	S	1.8	1.3		S	S	S	Z8	2.9	3.2	3.3	5.4	3.2	3.0	4.4	Z3	3.6	Z1	S	S	S	S	1.8
18	S	E	S			S	S	S	Z8	2.9	3.2	3.3	3.3	3.6	3.7	2.5	S	S	S	1.8	S	S	S	S
19	E	S				S	S	S	3.0		3.6	3.7	3.3	2.6 <sup>f</sup>	3.1	3.1	S	S	A	A	Z5	Z4	A	Z6
20	S				1.1	1.6	S	S	B	B	2.4 <sup>q</sup>	3.6	5.4				Z8	Z8	S	S	1.6	1.9	E	Z2
21	A	Z1	S	S	E	S	S	S	B	B	3.0	3.6	5.4				Z8	Z8	S	S	1.6	1.9	E	Z2
22	S	1.6	A	1.8	1.5	S	S	S	Z7	3.0	4.4 <sup>s</sup>	5.2	3.8 <sup>s</sup>	6.2	2.9	2.8	Z8	Z8	3.1	2.9	1.9	Z4	Z0	S
23	S	S	S	E	1.3	S	S	S	Z5	5.3	3.0	5.1 <sup>A</sup>	3.2	3.4	3.1	3.7	Z1	Z4	Z0	S	S	Z4	E	Z2
24	S	S	S	E		S	S	S	Z5	2.6 <sup>f</sup>	3.3	2.5 <sup>q</sup>	2.6 <sup>f</sup>	3.2	3.0	2.7	Z2	Z8	S	1.9	Z1	Z1	S	S
25	S	S	A	1.4		S	S	S	Z7	2.5	3.3	3.1	3.3	3.5	3.0	2.9	3.7	4.0	Z5	1.8	1.9	Z0	S	1.9
26	Z5	A	1.7	A	1.6	S	S	S	Z7	3.1	3.1	3.3	3.3	2.4 <sup>f</sup>	2.9	2.7	3.5	5.1	3.1	Z5	Z2	1.9	S	1.6
27	S	S	S	E	1.6	S	S	S	G	2.7 <sup>f</sup>	3.1	3.1	3.1	3.2	2.5 <sup>A</sup>		Z5	Z2	S	S	S	S	1.7	1.9
28	S	S	1.5	S	E	S	S	S	S	3.1	3.8	3.2	3.3	3.0	2.8	Z1	S	Z1	1.8	1.9	1.7	Z0	1.7	1.8
29	E	1.8	1.5	S		S	E	S	Z7	3.3	3.3	3.3	3.9	3.5	3.1		Z2	1.9	Z4	S	Z4	E	S	S
30	S	S	1.8	1.6	1.7	S	S	S	Z7	2.5 <sup>f</sup>	3.2	G		2.2 <sup>f</sup>	3.8	3.0	B	B	S	S	S	S	S	S
31																								
No.	12	11	18	17	17	5	3	Z	Z1	Z0	Z2	Z4	Z2	Z1	Z4	Z4	1.8	Z0	19	13	17	19	15	Z0
Median	Z0	1.6	1.4	1.3	1.9	1.9	1.9	Z4	Z8	3.2	3.3	3.6	3.6	3.4	3.1	3.0	2.6	Z6	Z8	1.9	Z2	Z0	Z1	1.9

The Radio Research Laboratories, Japan.

Sweep / sec Mc to 20 Mc in 20 sec in automatic operation.

fbEs

K 5

# IONOSPHERIC DATA

**Kokubunji Tokyo**

Lat. 35° 42.4' N  
Long. 139° 28.3' E

Nov. 1960

f-min

135° E Mean Time (GMT.+9h.)

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 1.15	E 1.60	E 1.40	E 1.05	E	E 2.30	E 1.90	E 3.10	Z 2.75	E 1.90	Z 2.00	Z 2.25	Z 2.10	Z 2.15	E 1.90	E 1.90	E 1.85	E 1.75	E 1.70	E 1.80	E 1.90	E 1.60	E 1.70	E 1.30	
2	E 1.70	E 1.50	E 1.10	E 1.00	E 1.10	E 1.50	E 1.80	E 2.55	E 1.90	Z 1.10	Z 1.10	Z 1.15	Z 1.10	Z 2.00	Z 1.10	E 1.80	E 1.60	E 1.60	E 1.80	E 1.80	E 1.80	E 1.70	E 1.60	E 1.60	
3	E 1.60	E 1.95	E 1.80	E 1.05	E 1.20	E 2.10	E 1.50	E 2.30	E 1.75	E 1.60	Z 1.10	Z 2.00	E 1.95	Z 2.70	E 1.90	E 1.90	E 1.80	E 1.80	E 1.70	E 1.80	E 1.90	E 1.80	E 1.40	E 1.30	
4	E 1.60	E 1.40	E 1.05	E	E 1.00	E 1.70	E 1.80	E 2.40	Z 2.00	Z 1.10	Z 1.10	Z 2.05	Z 2.10	Z 2.20	E 1.90	E 2.20	E 2.20	E 1.60	E 1.50	E 1.70	E 1.80	E 1.40	E 1.40	E 1.30	
5	E 1.60	E 1.05	E	E 1.10	E 1.60	E 1.60	E 1.80	E 2.30	E 1.55	E 1.80	Z 1.15	Z 2.25	Z 2.20	Z 2.15	E 1.90	E 1.85	E 2.20	E 1.90	E 1.90	E 1.55	E 1.30	E 1.70	E 1.50	E 1.50	
6	E 1.50	E 1.50	E 1.10	E 1.00	E 1.05	E 1.70	E 1.50	E 2.10	E 1.90	Z 2.25	Z 1.10	Z 2.30	Z 2.25	Z 2.10	Z 2.10	E 1.90	E 1.90	E 1.90	E 1.90	E 1.90	E 1.90	E 1.60	E 1.40	E 1.70	
7	E 1.40	E 1.70	E 1.45	E	E	E 1.10	E 1.80	E 2.60	E 1.95	E 1.90	Z 1.10	Z 1.10	Z 1.10	Z 2.00	Z 2.10	E 1.90	E 2.20	E 1.50	E 1.80	E 1.70	E 1.70	E 1.50	E 1.80	E 1.45	
8	E 1.80	E 1.70	E 1.50	E 1.00	E 1.10	E 1.40	E 1.80	E 2.10	E 1.90	Z 2.00	Z 1.10	Z 2.00	Z 1.10	Z 2.00	Z 2.00	E 1.70	E 1.50	E 1.70	E 1.80	E 1.90	E 1.90	E 1.80	E 1.60	E 1.50	
9	E 1.70	E 1.40	E 1.40	E 1.40	E 1.20	E 1.90	E 1.80	E 2.40	Z 2.00	Z 1.10	Z 2.00	Z 2.00	Z 2.15	Z 2.20	Z 2.10	E 1.15	E 1.80	E 1.50	E 1.90	E 1.80	E 1.70	E 1.40	E 1.80	E 1.30	
10	E 1.70	E 1.40	E 1.50	E 1.00	E 1.00	E 1.40	E 1.90	E 2.30	E 1.85	Z 1.10	Z 1.10	Z 2.20	Z 2.25	Z 2.40	Z 2.15	E 2.00	E 1.80	E 1.50	E 1.90	E 1.80	E 1.70	E 1.40	E 1.80	E 1.30	
11	E 1.80	E 1.60	E 1.40	E 1.05	E 1.20	E 1.70	E 1.65	E	E	Z 1.10	Z 1.50	Z 2.70	Z 2.40	E 1.10	E 4.30	Z 2.70	E 2.70	E 1.40	E 1.95	E	E	E	E	E 1.65	
12	E 1.50	E 1.30	E 1.20	E	E 1.10	E 1.30	E 1.50	Z 2.00	Z 2.00	Z 2.20	Z 2.25	Z 2.30	Z 2.65	Z 2.85	Z 2.20	E 2.10	E 2.20	E 1.80	E 1.80	E 1.80	E 1.20	E 1.50	E 1.80	E 1.20	
13	E 1.50	E 1.30	E 1.00	E 1.05	E 1.10	E 1.45	E 1.70	E 1.80	E 1.95	Z 1.10	Z 1.15	Z 2.20	Z 2.20	Z 2.05	Z 1.10	E 1.40	E 2.30	E 1.40	E 1.80	E 1.70	E 1.50	E 1.35	E 1.60	E 1.40	
14	E 1.50	E 1.10	E 1.30	E 1.00	E	E 1.50	E 1.50	E 2.10	E 1.95	E 1.95	Z 2.50	Z 2.30	Z 3.00	Z 2.80	Z 2.30	E 2.40	E 2.40	E 1.50	E 1.30	E 1.90	E 1.45	E 1.40	E 1.80	E 1.45	
15	E 1.30	E 1.50	E 1.80	E 1.10	E 1.00	E 3.00	E 1.50	E 1.95	E 1.80	Z 2.25	Z 1.10	Z 2.00	E 10.70	Z 8.00	Z 3.20	E 2.15	E 2.40	E 1.50	E 1.80	E 1.75	E 1.30	E 1.55	E 1.80	E 1.90	
16	E 1.70	E 1.60	E 1.60	E 1.05	E 1.05	E 1.80	E 1.40	E 2.40	E 2.10	Z 1.15	E 2.60	Z 2.45	E 2.60	Z 2.20	Z 2.10	E 2.05	E 1.75	E 1.80	E 1.95	E 1.70	E 1.35	E 1.90	E 1.30	E 1.60	
17	E 1.60	E 2.60	E 1.40	E 1.00	E 1.10	E 1.95	E 1.90	E 2.50	E 1.95	E 1.90	Z 1.15	Z 2.15	Z 2.10	Z 2.20	Z 2.05	E 2.05	E 1.85	E 1.70	E 1.95	E 1.85	E 1.40	E 1.40	E 1.90	E 1.70	
18	E 1.70	E 1.20	E 1.50	E 1.00	E 1.10	E 1.50	E 1.80	E 2.20	E 1.80	Z 1.10	Z 1.10	Z 2.20	Z 2.25	Z 2.15	E 1.80	E 2.00	E 1.40	E 1.60	E 1.80	E 1.80	E 1.60	E 1.35	E 1.45	E 1.20	
19	E 1.60	E 1.20	E 1.00	E 1.00	E 1.00	E 1.20	E 1.10	E 1.60	E 1.80	Z 1.10	Z 1.10	Z 2.10	Z 2.10	Z 2.45	Z 2.40	E 1.80	E 1.50	E 1.60	E 1.70	E 1.30	E 1.80	E 1.60	E 1.95	E 1.40	
20	E 1.80	E 1.40	E 1.30	E	E 1.00	E 1.50	E 1.10	E 2.20	E 1.80	Z 2.00	Z 2.00	Z 2.00	E 1.95	Z 2.10	E 1.70	E 1.90	E 1.70	E 1.60	E 1.60	E 1.70	E 1.80	E 1.45	E 1.60	E 1.70	
21	E 1.60	E 1.40	E 1.60	E 1.80	E 1.30	E 1.80	E 1.40	E 2.40	E 3.05	Z 3.50	Z 2.10	Z 2.10	Z 2.30	Z 2.30	Z 2.10	E 1.95	E 1.80	E 1.70	E 1.50	E 1.90	E 1.30	E 1.70	E 1.40	E 1.30	
22	E 1.80	E 1.60	E 1.05	E 1.00	E	E 1.20	E 1.80	E 2.00	E 1.50	Z 2.10	Z 2.15	Z 2.05	Z 2.05	Z 2.05	Z 2.05	E 1.85	E 1.60	E 1.30	E 1.80	E 1.35	E 1.50	E 1.40	E 1.80		
23	E 1.45	E 1.40	E 1.50	E 1.05	E 1.10	E 1.50	E 1.80	E 1.80	E 1.60	Z 2.00	Z 2.05	Z 2.00	E 1.95	E 1.95	E 1.80	E 1.85	E 1.75	E 1.75	E 1.70	E 1.90	E 1.85	E 1.60	E 1.60	E 1.70	
24	E 1.90	E 1.35	E 1.50	E 1.00	E 1.20	E 2.05	E 1.55	E 2.40	E 1.90	Z 2.10	Z 2.10	Z 2.20	Z 2.10	Z 2.10	E 1.80	E 1.60	E 1.70	E 1.30	E 1.70	E 1.50	E 1.60	E 1.35	E 1.60	E 1.40	
25	E 1.40	E 1.60	E 1.20	E 1.05	E 1.10	E 1.50	E 1.60	E 2.10	E 1.90	Z 2.15	Z 2.00	Z 2.05	Z 2.10	Z 1.80	E 1.80	E 1.70	E 1.90	E 1.80	E 1.60	E 1.60	E 1.80	E 1.30	E 1.40	E 1.40	
26	E 1.45	E 1.50	E	E 1.20	E 1.00	E 1.30	E 1.60	E 1.90	E 1.10	Z 2.00	Z 2.00	Z 2.00	Z 2.10	Z 1.90	E 1.80	E 1.80	E 1.80	E 1.90	E 1.50	E 1.40	E 1.60	E 1.30	E 1.40	E 1.40	
27	E 1.80	E 1.40	E 1.05	E 1.00	E 1.50	E 1.80	E 1.70	E 2.10	E 1.80	Z 1.90	Z 2.00	Z 2.15	Z 2.10	Z 2.10	Z 2.10	E 1.90	E 1.70	E 1.70	E 1.60	E 1.90	E 1.30	E 1.40	E 1.50	E 1.50	
28	E 1.80	E 1.50	E 1.10	E 1.00	E 1.00	E 1.90	E 1.40	E 2.30	E 2.90	Z 2.00	Z 2.00	Z 2.10	Z 2.00	E 1.95	E 1.90	E 1.60	E 1.90	E 1.55	E 1.30	E 1.70	E 1.40	E 1.70	E 1.50	E 1.40	
29	E 1.90	E 1.40	E 1.30	E 1.40	E 1.05	E 1.50	E 1.70	E 1.80	E 2.00	Z 2.10	Z 2.10	Z 2.20	Z 2.15	Z 2.10	Z 2.10	E 1.90	E 1.55	E 1.70	E 1.80	E 1.80	E 1.60	E 1.70	E 1.80	E 1.70	
30	E 1.80	E 1.65	E 1.70	E 1.00	E 1.05	E 1.70	E 1.80	E 2.10	E 1.90	Z 2.00	Z 1.90	Z 2.10	Z 2.20	Z 1.80	E 1.90	E 1.80	E 2.20	E 1.85	E 1.70	E 1.80	E 1.50	E 1.80	E 1.80	E 1.40	
31																									
No.	30	30	18	27	29	30	30	29	30	29	30	30	29	30	30	30	25	19	30	29	29	29	30	30	
Median	E 1.60	E 1.45	E 1.10	E 1.00	E 1.05	E 1.50	E 1.70	E 2.20	E 1.90	Z 2.10	Z 2.10	Z 2.10	Z 2.10	Z 2.10	Z 2.10	Z 2.10	E 1.80	E 1.50	E 1.70	E 1.80	E 1.60	E 1.60	E 1.60	E 1.40	

Sweep /... Mc to Z... Mc in Z... min in automatic operation.

The Radio Research Laboratories, Japan.

# IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 28.3' E

## Kokubunji Tokyo

135° E Mean Time (GMT.+9h.)

Nov. 1960

(M3000)F2

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	2.55	2.45	2.55	2.55	2.65	2.55	2.85	3.35	3.35	3.10	3.15	3.20	3.10	3.10	3.15	3.25	3.25	3.35	3.10	3.00 <sup>A</sup>	3.15	2.90	2.75	2.65
2	3.00	2.70	2.70	2.65	2.75	2.75	2.95	3.20	3.20	3.25	3.15	3.15	3.05	3.05	3.15	3.25	3.30	3.30	3.15	3.05	2.90	2.75	2.65	2.70
3	2.85	2.90	3.05	3.35	2.55	2.85	3.20	3.35	3.20	3.20	3.05	3.10	3.00	3.05	3.10	3.10	3.30	3.35	2.95	2.85	2.95	2.75	2.65	2.70
4	2.75	2.90	3.10	3.05	2.65	2.75	3.10	3.20	3.25	3.20	3.05	3.20	3.00	2.90	3.10	3.05	3.05	3.00	2.75	2.85	3.05	2.90	2.80	2.90
5	3.00	2.75	2.55	2.55	2.65	2.90	3.00	3.20	3.15	3.30	3.15	3.20	2.95	3.00	3.05	3.05	3.15	2.95	3.15	3.05	2.90	3.00	2.85	2.95
6	2.55	2.50	2.50	2.95	2.70	2.65	3.00	3.35	3.15	3.05	3.20	3.20	3.10	3.05	3.05	3.15	3.15	3.15	2.95	3.05	3.25	3.00	2.80	2.60
7	2.45	2.60	3.00	2.80	2.75	2.65	3.00	3.20	3.30	3.10	3.10	3.10	3.00	2.95	3.00	3.10	2.90	3.00	3.05	3.05	3.05	3.15	2.50	2.50
8	2.70	2.90	2.80	3.05	3.10	2.85	2.90	3.15	3.15	3.25	3.10	3.10	3.10	3.15	3.05	3.25	3.20	3.15	3.05	3.15	3.00	2.80	2.75	2.70
9	2.60	2.55	2.50	2.75	2.75	2.85	3.05	3.15	3.25	3.20	3.25	3.05	3.10	3.10	3.10	3.15	3.15	3.10	3.10	2.95	2.80	2.90	2.70	2.55
10	2.50	2.85	2.75	2.85	2.60	2.70	3.05	3.10	3.30	3.25	3.10	3.15	3.05	2.95	3.10	3.15	3.15	3.20	2.90	C	C	C	2.65	2.55
11	2.55	2.55	2.65	2.85	2.70	2.55	2.90	C	C	3.25	3.05	3.05	2.95	3.00	3.00	3.00	3.15	3.10	2.95	3.05	3.05	2.65	2.50	2.55
12	3.10	3.05	2.55	2.50	2.45	2.50	2.85	3.30	3.30	3.15	3.10	3.15	3.00	3.00	2.90	3.05	3.10	3.10	3.00	3.20	2.95	2.90	2.65	2.70
13	2.70	2.65	2.40	2.70	2.40	2.25	3.25	3.40	2.85	2.55	3.05	2.90	2.90	2.90	2.90	2.85	2.80	2.35	2.55	2.55	2.70	2.70	S	F
14	S	2.70	F	F	F	3.00	3.05	3.00	3.20	3.10	2.95	3.20	2.95	3.20	3.05	3.20	3.15	3.10	3.30	3.20	3.00	3.00	2.95	A
15	A	2.55	2.80	3.15	3.05	2.75	2.90	3.25	3.45	3.15	3.10	3.10	R	3.00	3.05	2.95	3.00	3.10	3.15	2.95	3.20	3.05	2.90	3.00
16	2.40	2.30	2.40	2.50	2.55	2.40	2.90	3.20	2.85	3.15	2.95	2.90	2.90	2.75	2.75	2.90	3.05	3.00	2.60	2.50	2.80	S	2.90	3.30
17	2.40	2.35	2.60	2.90	2.75	A	2.65	3.15	3.30	3.05	3.10	3.10	2.95	3.00	3.00	3.10	3.20	3.15	2.80	3.20	3.20	3.15	2.70	2.80
18	2.55	2.70	2.60	2.60	2.60	2.60	3.00	3.15	3.35	3.15	3.25	3.10	3.20	3.20	3.15	3.20	3.25	3.10	2.90	3.25	2.70	2.95	2.75	2.80
19	2.80	2.95	2.65	2.65	2.40	2.50	2.95	3.45	3.35	3.15	3.25	3.15	3.15	3.05	3.25	3.25	3.35	3.30	2.95	3.25	2.85	2.85	2.80	2.50
20	2.70	2.70	2.75	2.75	2.90	3.05	2.95	3.15	3.30	3.20	3.25	3.15	3.05	3.15	3.20	3.10	3.40	3.10	3.25	3.10	3.20	2.85	2.80	2.70
21	2.70	2.65	2.70	2.70	2.70	2.60	2.80	3.25	3.30	3.30	3.25	3.10	3.00	3.10	3.20	3.25	3.15	3.20	3.10	3.35	2.75	2.60	2.70	2.45
22	2.45	2.55	2.40	2.25	2.15	2.45	2.65	2.90	3.15	3.05	3.20	3.15	3.10	3.25	3.25	3.25	2.90	3.15	3.25	3.05	3.10	2.90	2.95	2.95
23	2.75	2.50	2.75	2.60	2.55	2.70	3.05	3.65	3.55	3.05	3.20	3.20	3.20	3.20	3.20	3.20	3.50	3.25	2.85	3.15	3.35	3.10	3.05	2.70
24	2.75	2.80	2.70	2.60	2.85	2.75	3.10	3.35	3.30	3.35	3.25	3.35	3.20	3.15	3.10	3.35	3.45	3.15	3.15	3.15	3.20	3.35	2.70	2.65
25	2.75	2.70	2.70	2.75	2.75	2.50	2.90	3.35	3.50	3.20	3.20	3.20	3.20	3.20	3.15	3.15	3.20	3.25	3.20	3.10	2.60	2.75	2.65	2.25
26	3.45	2.80	2.50	2.40	2.40	2.50	2.75	3.20	3.15	3.20	3.10	3.30	3.15	3.20	3.20	3.20	3.35	3.15	3.35	3.10	2.90	2.80	2.75	2.85
27	2.90	2.90	3.15	3.50	2.60	2.75	2.80	3.10	3.35	3.50	3.40	3.20	3.15	3.20	3.35	3.40	3.15	3.25	3.40	3.15	2.70	2.70	2.80	2.70
28	2.65	2.70	2.65	2.55	2.70	2.70	3.30	3.20	3.20	3.15	3.40	3.40	3.30	3.15	3.25	3.25	3.30	3.45	3.05	3.05	2.95	2.65	2.80	2.70
29	2.70	2.75	2.65	2.90	2.75	2.65	2.85	3.30	3.25	3.30	3.25	3.30	3.35	3.25	3.25	3.35	3.25	3.25	3.30	2.95	2.95	2.85	2.65	2.65
30	3.00	2.65	2.80	2.85	2.90	2.75	2.80	3.30	3.35	3.25	3.35	3.45	3.25	3.10	3.25	3.35	3.45	3.15	3.25	3.55	2.90	2.75	2.70	2.65
31																								
No.	18	19	30	29	29	29	30	30	29	30	30	30	29	30	30	30	30	30	30	29	29	28	29	28
Median	2.70	2.70	2.70	2.75	2.70	2.65	2.90	3.20	3.30	3.20	3.15	3.15	3.10	3.10	3.10	3.20	3.20	3.15	3.10	3.10	2.95	2.90	2.75	2.70

Sweep 1.0 Mc to 2.0 Mc in 2.0 sec in automatic operation.

(M3000)F2

The Radio Research Laboratories, Japan.

K 7



IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

(M3000)F1

135° E Mean Time (GMT. + 9h.)

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L		L	L	L											
2										L	L	L	L	L	L									
3										L	L	L	L	L	L									
4											L	L	L	L	L									
5												L	L	L	L									
6																								
7											L	L	L	L										
8											L	L	L	L										
9												C												
10																								
11								C	C				L	B										
12											L													
13										L	L													
14										A	A	A	B	B										
15										A	S	A	S	A										
16																								
17																								
18										L	L		A											
19																								
20																								
21																								
22										S	A	A	AS	A										
23									A	L	A	L	L											
24																								
25										L	L													
26										L	L	L	L	L										
27										L	L	L	L	L										
28																								
29																								
30																								
31																								
N o.																								
Median																								

Sweep 1.0 Mc to 2.00 Mc in 20 sec in automatic operation.

The Radio Research Laboratories, Japan.

K 8

(M3000)F1

# IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

**Kokubunji Tokyo**

135° E Mean Time (GMT. + 9h.)

R'F2

Nov. 1960

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									Z Z 5		Z 4 5	Z 5 0	Z 5 0											
2										Z 4 5	Z 5 0	Z 5 0		Z 5 5	Z 5 0									
3										Z 4 5	Z 5 0	Z 5 0		Z 5 5										
4											Z 4 5	Z 5 0	Z 5 0		Z 6 0									
5												Z 4 5	Z 5 0											
6													Z 3 0											
7											Z 3 0	Z 5 0	Z 5 5											
8												C												
9																								
10																								
11								C	C				Z 5 5	F 3 0 5 <sup>B</sup>										
12											Z 5 0													
13									3 0 0	Z 5 0				Z 5 5										
14												F 3 0 0 <sup>A</sup>		Z 5 5										
15									F 2 7 0 <sup>A</sup>				3 0 0	Z 7 5										
16									Z 5 0	Z 6 0	Z 5 0	Z 5 0	Z 5 0	Z 5 5										
17																								
18									Z 5 5				Z 5 5											
19										Z 3 0														
20																								
21																								
22									Z 7 0	Z 6 0			Z 4 5	Z 5 0										
23									Z 6 0	Z 5 0	Z 5 0	Z 5 0												
24																								
25										Z 5 0	Z 4 0													
26									Z 5 0		Z 3 5			Z 5 0										
27									Z 4 0	Z 4 0	Z 4 0	Z 3 0	Z 5 0											
28									Z 5 5															
29																								
30																								
31																								
No.									1	8	12	11	11	8	7									
Median									Z 2 5	Z 5 5	Z 5 0	Z 5 0	Z 5 0	Z 5 5	Z 5 5									

R'F2

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 28.3' E

Kokubunji Tokyo

135° E Mean Time (GMT.+ 9h.)

R<sub>1</sub>F

Nov. 1960

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	3.00	3.45	3.75	3.85	3.00	4.00	3.00	2.35	2.00	2.30	2.10	2.10	2.05	2.50	2.40	2.20	2.55 <sup>A</sup>	2.10	2.45 <sup>A</sup>	A	2.50	2.70	3.10	3.45
2	2.55	2.55	2.90	3.00	2.75	3.05	2.55	2.40	2.30	2.30	2.05	2.05	2.25	2.20	2.30	2.35	2.10	2.15	2.45	2.60	3.05 <sup>A</sup>	3.00	3.35	3.10
3	3.05	2.50	2.55	2.70	2.25	3.00	2.35	2.40	2.35	2.20	2.10	2.05	2.30	2.25	2.35	2.30	2.30	2.00	2.40	2.50	2.50	2.70	3.00	3.00
4	2.60	2.60	2.50	2.50	2.45	2.50	2.10	2.10	2.10	2.10	2.30	2.00	2.10	2.50	2.35	2.30	2.25	2.05	2.50	2.60	2.50	2.50	2.60	2.70
5	2.55	2.60	3.45	3.50	3.05	2.50	2.55	2.45	2.20	2.20	2.25	2.25	2.05	2.30	2.35	2.30	2.10	2.50 <sup>B</sup>	2.50 <sup>A</sup>	2.40	2.50	2.90	2.80	2.50
6	3.50	3.40	3.50	2.60	2.30	3.00	2.55	2.30	2.10	2.30	2.30	2.30	2.25	2.35	2.30	2.30	2.10	2.20	2.45	2.40	2.25	2.50	3.00	3.50
7	3.70	3.30	2.50	2.50	2.60	3.10	2.60	2.15	2.10	2.10	2.30	2.05	2.30	2.40	2.30	2.20	2.10	2.30	2.50 <sup>A</sup>	2.45	2.55	2.45	3.10	3.25
8	3.05	2.80	2.60	2.50	2.10	2.55	2.50	2.25	2.25	2.30	2.10	2.20	2.30	2.45	2.40	2.45	2.40 <sup>A</sup>	2.20	2.55 <sup>A</sup>	2.60 <sup>A</sup>	A	A	3.20 <sup>A</sup>	3.05
9	3.05	3.05	3.50	3.00	2.60	2.55	2.20	2.05	2.05	2.05	2.30	2.40 <sup>C</sup>	2.50	2.45 <sup>A</sup>	2.40	2.45	2.10	2.05	2.70 <sup>A</sup>	2.55 <sup>A</sup>	3.00 <sup>A</sup>	2.45	2.60	3.05
10	3.50	2.95	2.70	2.40	2.50	3.05	2.55	2.10	2.25	2.40	2.30	2.25	2.25	2.30 <sup>A</sup>	2.50	2.40	2.30	2.10	2.50 <sup>A</sup>	C	C	C	2.90	4.00
11	3.70	3.10	3.00	2.50	2.55	3.45	2.80	C	C	2.30	2.30	2.30	2.30	2.40 <sup>B</sup>	2.45 <sup>B</sup>	2.30	2.75	2.05	2.50	2.30	2.30	2.55	3.55	3.40
12	2.45	2.45	3.55	3.50	3.50	3.50	2.95	2.40	2.25	2.30	2.05	2.30	2.25	2.40	2.40	2.35	2.30	2.05	2.25	2.25	2.45	2.50	2.65	3.40
13	3.10	3.40	3.75	3.05	3.95	4.25	2.10	2.00	2.25	2.45	2.30	2.05	2.35	2.45	2.30	2.50	2.60	3.20	3.45	3.20	2.25	2.30	4.00	2.60
14	2.05	3.30 <sup>A</sup>	3.05	2.00	3.95	4.20	2.45	2.05	2.30 <sup>A</sup>	2.30	2.30	2.30	2.50	2.40 <sup>B</sup>	2.30	2.25	2.20	2.30	2.10	2.05	2.50	2.60	2.80	A
15	A	3.50	3.05	2.75	2.55	3.00	2.55	2.25	2.30	2.40 <sup>A</sup>	2.30	2.25	B	B	2.45	2.05	2.10	2.30	2.20	2.50	2.50	2.30	2.25	2.95
16	4.50	4.50	4.15	3.60	3.50	3.80	2.55	2.35	2.40	2.20 <sup>A</sup>	2.10	A	S	2.40 <sup>A</sup>	2.50	2.50	2.10	2.05	3.00	3.05	2.95	2.45	2.10	2.75
17	3.50	3.95	3.45	2.50	2.30	2.50	2.70	2.45	2.35	2.25	2.25	2.30	2.30	2.30	2.35	2.30	2.25	2.15	2.55	2.40	2.50	2.50	3.00	3.50
18	3.50	3.00	3.50	3.30	3.50	3.05	2.55	2.20	2.20	2.30 <sup>A</sup>	2.25	2.50 <sup>A</sup>	2.40 <sup>A</sup>	2.30	2.30	2.40 <sup>A</sup>	2.75	2.40 <sup>A</sup>	2.60	2.30	2.75	2.55	3.05	2.90
19	2.90	2.75	2.75	3.00	3.50	3.40	2.55	2.30	2.30	2.20	2.00	2.30	2.30	2.30	2.30	2.40	2.25	2.05	2.55	2.30	2.60	2.70	3.30	3.50
20	3.50	3.05	2.90	2.90	2.60	3.05	2.55	2.30	2.25	2.30	2.25	2.30	2.25	2.30	2.30	2.40	2.20	2.05	2.45	2.50 <sup>A</sup>	3.50 <sup>A</sup>	3.05	A	3.60
21	3.35 <sup>A</sup>	3.55	3.10	3.10	3.00	3.00	2.95	2.30	2.45	2.50	2.40	2.40	2.50 <sup>A</sup>	2.55	2.50	2.30	2.40	2.50	2.50	2.20	2.50	3.05	2.95	3.70
22	3.90	3.50	3.75	4.40	4.50	3.80	3.90	2.60	2.50	2.45	2.30 <sup>A</sup>	2.50 <sup>A</sup>	A	2.50 <sup>A</sup>	2.25	2.40	2.20	2.40	2.50	2.50	2.50	2.80	2.50	3.00
23	3.00	3.40	3.20	3.40	3.50	3.00	2.50	2.20	2.05	2.30 <sup>A</sup>	2.10	2.20 <sup>A</sup>	2.10	2.30	2.30	2.30	2.15	2.05	2.80	2.50	2.15	2.50	2.55	3.30
24	3.05	2.60	3.05	2.95	2.85	3.05	2.55	2.20	2.10	2.30	2.20	2.30	2.25	2.20	2.25	2.30	2.10	2.40	2.50	2.50	2.50	2.20	3.05	3.05
25	3.05	3.50	3.40	2.90	2.80	3.50	2.70	2.30	2.05	2.20	2.05	2.05	2.30	2.30	2.40	2.40	2.40	2.10	2.45	2.10	3.20	3.00	3.10	2.45
26	2.50 <sup>A</sup>	2.25	3.95	4.30	4.05	3.55	2.95	2.45	2.40	2.30	2.30	2.05	2.40	2.10	2.30	2.30	2.10	2.50 <sup>A</sup>	2.50 <sup>A</sup>	2.55	2.60	2.80	2.90	2.55
27	3.00	2.95	2.45	2.00	3.55	3.50	3.00	2.45	2.40	2.20	2.20	2.05	2.20	2.30	2.30	2.20	2.05	2.00	2.25	2.10	2.25	2.95	3.10	3.10
28	3.30	3.05	3.40	3.00	2.50	3.30	3.05	2.10	2.25	2.30	2.30	2.20	2.10	2.10	2.10	2.10	2.30	2.05	2.40	2.50	2.40	3.10	3.00	3.00
29	3.05	3.05	3.00	2.50	2.50	3.10	2.75	2.40	2.40	2.30	2.30	2.30	2.30	2.30	2.20	2.30	2.00	2.20	2.50	2.45	3.00 <sup>A</sup>	2.95	3.10	3.20
30	2.65	3.10	3.00	3.00	2.80	3.05	3.00	2.45	2.30	2.20	2.45	2.25	2.10	2.05	2.20	2.30	2.25	2.10	2.20	2.10	2.60	2.55	3.10	3.05
31																								
No.	29	30	30	30	30	29	30	29	29	30	30	27	26	29	29	30	28	29	29	27	26	28	28	28
Median	3.05	3.10	3.10	2.90	2.90	2.90	3.05	2.55	2.30	2.25	2.30	2.25	2.30	2.30	2.30	2.30	2.20	2.10	2.50	2.45	2.50	2.60	3.00	3.05

Sweep 1.0 Mc to 20.0 Mc in 20.0 min in automatic operation.

The Radio Research Laboratories, Japan.

R<sub>1</sub>F

K 1 U

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

135° E Mean Time (GMT. + 9h.)

R'ES

Nov. 1960

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	105	E	E	100	B	S	B	120	115	G	105	100	100	100	105	105	105	100	100	100	100	100	100	100
2	S	E	100	100	E	S	B	S	120	135	105	G	105	G	105	105	100	100	100	S	105	100	100	100	100
3	100	S	S	E	E	S	S	S	120	G	G	105	G	100	G	G	G	105	100	S	S	S	S	100	100
4	S	E	100	100	100	100	S	S	105	G	145	145	150	G	G	130	120	110	105	105	105	105	105	105	105
5	100	100	105	E	S	S	S	S	145	110	105	G	G	G	G	G	G	S	S	S	S	S	105	105	105
6	S	S	100	100	E	S	G	G	G	110	105	105	100	100	100	100	B	100	100	100	100	100	100	100	100
7	100	100	100	100	100	100	B	S	G	110	105	105	100	100	100	100	115	100	100	100	100	100	100	100	100
8	S	S	100	100	105	105	S	S	105	G	140	140	120	100	100	105	105	105	100	100	100	100	100	100	100
9	100	S	S	100	100	S	S	S	G	G	110	C	105	105	100	105	105	105	105	100	100	100	100	100	100
10	S	E	S	E	E	S	S	B	G	G	110	110	110	110	110	105	105	105	100	100	C	C	100	100	105
11	S	S	E	E	E	S	S	C	C	110	G	110	G	B	B	110	S	B	S	S	S	S	S	S	E
12	S	S	100	100	E	E	B	G	115	110	110	105	105	115	105	110	B	S	S	S	S	S	S	S	105
13	105	100	100	105	105	E	B	G	125	115	110	110	105	110	110	110	S	G	S	S	S	E	145	135	140
14	115	115	110	E	150	S	S	S	120	135	115	110	105	B	110	G	S	155	E	S	S	110	110	105	100
15	100	100	100	105	105	S	S	110	110	105	105	G	B	B	110	105	B	110	110	110	105	105	E	S	S
16	S	S	105	E	E	S	S	S	110	105	105	105	105	105	105	105	100	S	100	100	S	105	105	105	105
17	S	S	105	105	E	100	105	S	G	125	G	110	105	125	110	110	110	115	115	100	100	S	E	E	105
18	S	E	S	105	105	S	S	S	110	105	105	105	105	105	100	100	100	100	100	100	100	S	110	E	105
19	105	E	E	E	E	E	E	S	110	110	140	110	G	G	105	105	105	S	S	105	S	S	S	S	E
20	S	S	E	E	E	110	105	G	105	G	105	105	105	105	110	110	G	S	105	110	105	105	105	105	105
21	100	105	S	S	105	S	S	S	B	B	105	100	100	G	G	G	110	110	S	S	105	110	105	105	105
22	S	105	105	105	100	105	100	S	150	125	110	110	105	105	105	105	100	105	105	100	105	105	105	105	S
23	S	E	S	E	110	S	S	155	100	105	100	100	100	100	100	100	100	100	100	100	S	105	105	100	100
24	S	E	E	105	E	S	S	S	110	110	105	105	105	100	105	105	105	105	105	100	100	105	105	105	S
25	E	100	100	100	E	S	S	S	155	G	G	105	105	100	100	100	100	100	100	100	100	100	100	100	110
26	105	105	105	100	100	S	S	S	110	105	105	105	105	105	100	100	100	100	100	100	100	100	100	100	100
27	S	S	E	105	105	S	S	S	140	105	110	105	105	105	105	G	105	100	100	100	100	100	100	100	105
28	S	S	105	E	105	S	S	S	140	120	110	110	110	110	110	110	S	105	105	105	105	105	105	105	100
29	100	105	105	S	E	S	105	G	140	120	110	120	110	110	110	G	100	100	105	105	105	105	105	105	S
30	S	S	105	100	110	S	S	S	G	105	160	125	G	100	100	100	B	B	S	S	S	S	S	S	E
31																									
No.	12	11	18	17	17	6	3	2	21	20	22	24	24	21	25	23	18	20	19	13	17	18	15	20	
Median	100	105	100	100	105	100	105	130	115	110	110	105	105	105	105	105	105	100	100	100	105	105	105	105	105

The Radio Research Laboratories, Japan.

Sweep / sec to 2.0 Mc in 20 sec in automatic operation.

R'ES

K 11

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 28.3' E

Kokubunji Tokyo

135° E Mean Time (GMT. + 9h.)

Types of Es

Nov. 1960

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	fz	f	f	f	f				h	C	l	l	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	f <sup>z</sup>	f <sup>4</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	
2	f								h	h	l	l	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
3									h	h	l	l	l <sup>z</sup>	l <sup>z</sup>	l <sup>z</sup>	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
4	f	f	f	f <sup>z</sup>	f <sup>z</sup>	f			h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
5	f	f	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f			h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
6	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f			h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
7	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f			h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
8	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f			h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
9	f	f	f	f	f				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
10	f	f	f	f	f				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
11									h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
12									h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
13	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
14	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
15	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
16	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
17	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
18	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
19	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
20	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
21	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
22	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
23	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
24	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
25	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
26	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
27	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
28	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
29	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
30	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>	f <sup>z</sup>				h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
31									h	h	l	h	h	h	h	h	h	l	f <sup>z</sup>	f <sup>z</sup>	f	f <sup>z</sup>	f <sup>z</sup>	
No.																								
Median																								

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

IONOSPHERIC DATA

135° E Mean Time (GMT.+9h.)

fpF2

Nov.1960

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	380	455 <sup>S</sup>	415 <sup>S</sup>	400	400	405	355 <sup>S</sup>	355 <sup>S</sup>	355 <sup>S</sup>	280 <sup>S</sup>	275	280	300	295	300	280 <sup>S</sup>	260	255	295	310 <sup>A</sup>	295	325	390	395
2	320	370	350	380	350	350 <sup>S</sup>	310	285	280	255	295	285	300	305	300	265	255 <sup>S</sup>	260	290	275	335 <sup>S</sup>	375 <sup>S</sup>	400	375
3	345	305	300 <sup>S</sup>	250 <sup>S</sup>	385	295	295	260	270 <sup>S</sup>	295	310	305	300	305	300	300	295	255	255	310	315	330	380	360
4	350	330 <sup>S</sup>	300	300	350	345	300	300	295 <sup>S</sup>	300	300	300	325	345	305	305	300 <sup>S</sup>	305	355	350 <sup>S</sup>	300	330	350	350
5	310	355 <sup>S</sup>	405 <sup>S</sup>	445 <sup>S</sup>	395 <sup>S</sup>	305	310 <sup>S</sup>	295 <sup>S</sup>	300	290	305	300	315	305	310	300	300	305	295	300	330	320	335	305
6	405	400 <sup>S</sup>	405	330	335 <sup>S</sup>	355 <sup>S</sup>	305	255	290	305	300	300	305 <sup>H</sup>	310	305	300	300	300	305	300	275	300	350 <sup>S</sup>	400 <sup>S</sup>
7	440	390	305	305	350	355 <sup>S</sup>	305	285 <sup>S</sup>	260	300	300	300	305	320	305	300	300	305	300	300	3300 <sup>S</sup>	400	400	400 <sup>S</sup>
8	390	330 <sup>S</sup>	345	300 <sup>S</sup>	290	300	310	290 <sup>S</sup>	300	295	300	305	335	300	305	300	290	300	305	300 <sup>S</sup>	A	A	350	355
9	390	400 <sup>S</sup>	405	360	315	300 <sup>S</sup>	305	285 <sup>S</sup>	290	290	300	330 <sup>C</sup>	305	305	330	300	300	300	300	300	345	325	350	400
10	405	335 <sup>S</sup>	350	305	390	360 <sup>S</sup>	300	300	280 <sup>S</sup>	290 <sup>S</sup>	300	300	310	350 <sup>H</sup>	305	300	300	290	290	310	C	C	355	410
11	415	400	375	315 <sup>S</sup>	350	405 <sup>S</sup>	330	C	300	305	305	340	335	320	305	300	300	305	305	305	300	385	440	430
12	300	300	405	430	430	405	345	270 <sup>S</sup>	295	300	300	300	325	335	345	305	300	305	305	280	305	310	365	380
13	360	395	445	375 <sup>S</sup>	455	500 <sup>H</sup>	270 <sup>S</sup>	255	330	430	295	330 <sup>A</sup>	345	350	345	345	355	455	455	470	360	380	S	F
14	S	A	380 <sup>S</sup>	F	FS	500 <sup>H</sup>	300 <sup>F</sup>	305 <sup>S</sup>	300 <sup>H</sup>	320	280	305	310	300	310	295	300	300	290	290	280	305	310	A
15	A	400	355	300	305	350	330	275 <sup>S</sup>	255	295	300	300	R	310 <sup>A</sup>	300 <sup>S</sup>	300 <sup>S</sup>	275 <sup>S</sup>	300 <sup>S</sup>	300 <sup>S</sup>	325	290	295 <sup>S</sup>	305	305
16	490	500 <sup>F</sup>	445 <sup>S</sup>	470 <sup>F</sup>	455	445	335 <sup>S</sup>	275 <sup>S</sup>	320	280	320 <sup>H</sup>	340 <sup>S</sup>	345 <sup>S</sup>	325	355	330 <sup>S</sup>	305	325	450	435	360 <sup>S</sup>	S	325 <sup>S</sup>	270
17	450	485	400 <sup>S</sup>	330	340 <sup>S</sup>	A	385 <sup>S</sup>	280	260	300	300	300 <sup>S</sup>	300 <sup>S</sup>	305	320	295	270 <sup>S</sup>	270 <sup>S</sup>	350 <sup>S</sup>	270	3300 <sup>S</sup>	300	365	380
18	400	360	395	395	395	380	300 <sup>S</sup>	290 <sup>S</sup>	255	305	295	305	300	300	305	300	300 <sup>S</sup>	290	330	280	355	305	355	335
19	330	305	355	355	430	395	305	255 <sup>S</sup>	265 <sup>S</sup>	295 <sup>S</sup>	300	285	300	305	280	290 <sup>S</sup>	265	270	305	280	310	330	355	405
20	400	365	350 <sup>S</sup>	355 <sup>S</sup>	305	375	310	285 <sup>S</sup>	255	300	295	300	305	300	300	290	260	290	280 <sup>H</sup>	340 <sup>A</sup>	345	325	345 <sup>A</sup>	395
21	390 <sup>A</sup>	400	375	380	350	380 <sup>S</sup>	355	280	290	290	295	305	320	305	300	255	300	295	300	265	335	380	355	450
22	450	395	430 <sup>A</sup>	495	510	435 <sup>A</sup>	405	330	305	310	295 <sup>H</sup>	290 <sup>S</sup>	285	280	280	295	280	300 <sup>S</sup>	290	305	300	330	305	320
23	350	395	360 <sup>S</sup>	405	400	360 <sup>S</sup>	300	240	235	305	280	260	275	265	285	260 <sup>S</sup>	280	260	310	295	225 <sup>S</sup>	260 <sup>S</sup>	305	380
24	365 <sup>S</sup>	350	375 <sup>S</sup>	390	360 <sup>S</sup>	355 <sup>S</sup>	295 <sup>S</sup>	260 <sup>H</sup>	265	300	290	300	300	300	300	280	250	290	300	300 <sup>S</sup>	290	255	355	355
25	375	375 <sup>A</sup>	360	355	350	400	320	285 <sup>S</sup>	255	300	300	300	295	300 <sup>S</sup>	300	300	300	280	290	280	390	375	380 <sup>S</sup>	290
26	250	330 <sup>A</sup>	405	440 <sup>A</sup>	450	405	350	290 <sup>S</sup>	300	300 <sup>S</sup>	305	295	300	300 <sup>S</sup>	300	275	260	280	285	300	310	335	350	310
27	335	330	290	245	370	375 <sup>S</sup>	335	295	275	255	265	300	300	300	280	250 <sup>S</sup>	280	295	265	255	290	350	370	350
28	365	380	385	380	300	355	355	255	300	300	265	300	295	300	300	275	280	250	300	305	300	385	350	350
29	375	355	355	305	330	380	330	255 <sup>S</sup>	280 <sup>H</sup>	285 <sup>S</sup>	300	285	270	305	255	260	255 <sup>S</sup>	270	275	275	310	330	355	365
30	305	355	355	350	330	350	345	280 <sup>S</sup>	255	290	270	250	290	300	290 <sup>S</sup>	255	2255 <sup>S</sup>	285	260	240	305	310	365	380
31																								
No.	78	29	30	29	29	29	30	29	29	30	30	30	29	30	30	30	30	30	30	29	28	27	29	28
Median	375	370	375	355	350	375	310	280	280	300	300	300	300	305	300	300	290	290	300	300	305	325	355	370

Sweep / sec Mc to / sec Mc in automatic operation.

fpF2

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

135° E Mean Time (GMT.+9h.)

Nov. 1960

ypF2

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	90	95	90 <sup>S</sup>	105	90	95	95 <sup>S</sup>	95 <sup>S</sup>	125 <sup>S</sup>	115 <sup>S</sup>	120	75	95	85	100	75 <sup>S</sup>	90	100	105	90 <sup>A</sup>	70	125	80	105
2	80	80	100	110	105	105 <sup>S</sup>	110	105	70	95	65	70	95	85	80	85	100 <sup>S</sup>	90	85	125	95 <sup>S</sup>	75 <sup>S</sup>	80	95
3	105	100	95 <sup>S</sup>	95 <sup>S</sup>	65	105	80 <sup>S</sup>	80	75 <sup>S</sup>	50	85	85	100	80 <sup>S</sup>	90	90	55	55	95	95	125 <sup>S</sup>	95	105	90
4	100	70 <sup>S</sup>	95	100 <sup>S</sup>	100	100	95	50	50 <sup>S</sup>	50	55	95	75	95	85 <sup>S</sup>	95	90 <sup>S</sup>	90	100	90 <sup>S</sup>	90	110	100	95
5	85	90 <sup>u</sup>	90 <sup>u</sup>	55 <sup>u</sup>	100 <sup>S</sup>	95	85 <sup>S</sup>	55 <sup>S</sup>	55	60	75	65	90	95	85	90	55	90	80	95	115	80	110	95
6	95	105 <sup>S</sup>	100	75	120 <sup>u</sup>	100 <sup>S</sup>	90	65	65	85	55	50	85 <sup>H</sup>	85	80	50	55	55	100	90	60	100	95 <sup>S</sup>	90 <sup>S</sup>
7	65	105	85	140	95	95 <sup>S</sup>	85	170 <sup>S</sup>	75	50	80	70	95	90	90	100	80	95	80	90	70	80	95	90 <sup>S</sup>
8	100	70 <sup>S</sup>	100	80 <sup>S</sup>	100	95	90 <sup>u</sup>	75 <sup>S</sup>	55	55	90	90	55	75	90	50	65	95	75	80 <sup>S</sup>	A	A	90	90
9	105	95 <sup>u</sup>	105 <sup>S</sup>	90	85 <sup>S</sup>	75 <sup>S</sup>	90	95 <sup>S</sup>	95	105	90	170 <sup>C</sup>	90	90	65	95	80	90	95	90	105	120	145	95
10	100 <sup>S</sup>	70 <sup>S</sup>	105	100	105	90 <sup>S</sup>	90	80	65 <sup>S</sup>	65	60	80	85	85 <sup>H</sup>	90	55	95	60	100	C	C	105	95	
11	85	100	120	95 <sup>S</sup>	100	90 <sup>S</sup>	75	C	C	50	90	90	60	60	80	100	95	90	95	90	95	110	70	75
12	55	85	95	120	75	95	60	170 <sup>S</sup>	55	70	85	80	75	65	60	90	55	90	95	80	100	135	90	85
13	85	100	65	80 <sup>S</sup>	95	110 <sup>S</sup>	85 <sup>S</sup>	75	125	75	65	65 <sup>S</sup>	85	80	100	105	130	155 <sup>S</sup>	140	85	140	105	S	F
14	S	A	75 <sup>S</sup>	F	FS	95 <sup>u</sup>	95 <sup>u</sup>	90 <sup>A</sup>	50 <sup>H</sup>	75	110	75	90	65	85	100	90	50	55	70	90	90	90	A
15	A	100	95	90	95	95	70	75 <sup>S</sup>	75	60	105 <sup>S</sup>	100	R	100 <sup>K</sup>	105 <sup>u</sup>	110 <sup>S</sup>	150 <sup>u</sup>	125 <sup>u</sup>	100 <sup>S</sup>	105	105	110 <sup>S</sup>	110	135
16	110	75 <sup>E</sup>	110 <sup>S</sup>	70 <sup>F</sup>	100	105 <sup>u</sup>	120 <sup>S</sup>	75	85	75	95 <sup>R</sup>	115 <sup>S</sup>	105 <sup>F</sup>	135	145	100 <sup>S</sup>	135	120	120	125 <sup>u</sup>	130 <sup>S</sup>	S	155 <sup>S</sup>	105
17	105	95	100 <sup>S</sup>	100	105 <sup>S</sup>	A	95 <sup>S</sup>	90	110	100	95	100 <sup>S</sup>	100	100	120	125 <sup>u</sup>	130 <sup>S</sup>	120 <sup>u</sup>	100 <sup>S</sup>	105	70 <sup>S</sup>	80	130	70
18	95	95	105	100	95	115	95 <sup>u</sup>	105 <sup>S</sup>	90	60	60	60	80	60	50	55 <sup>u</sup>	45 <sup>S</sup>	105	80	75	90 <sup>S</sup>	95	75	70
19	65	90	130	95	65	105	95 <sup>u</sup>	90 <sup>S</sup>	70	50	50	50	80	80	55	60 <sup>S</sup>	65	75	100	70	90	80	90	95
20	90	85	95	90 <sup>S</sup>	90	75	85	75 <sup>S</sup>	80	65	55	55	90	65	55	60	70	105	170 <sup>A</sup>	80 <sup>A</sup>	55	80	100 <sup>A</sup>	100
21	80 <sup>A</sup>	90	70	70	95	80 <sup>S</sup>	85 <sup>S</sup>	65	55	55	55	55	75	60	65	80	55	50	55	75	70	115	140	90
22	95	100	100 <sup>A</sup>	105	135	110 <sup>S</sup>	95	70	60	95	100 <sup>S</sup>	125 <sup>S</sup>	105	90	70	60	65	95 <sup>u</sup>	60	75	95	75	95	75
23	95	105	95 <sup>S</sup>	100 <sup>S</sup>	95	95 <sup>S</sup>	95	55 <sup>S</sup>	60	80	70	90	100	100	110 <sup>S</sup>	125 <sup>S</sup>	65	115	120	105	120 <sup>S</sup>	95 <sup>S</sup>	100	65
24	85 <sup>S</sup>	90	80 <sup>S</sup>	85	90 <sup>S</sup>	75 <sup>S</sup>	105 <sup>S</sup>	80 <sup>u</sup>	115	70	50	60	55	60	80	65	55	100	55	60 <sup>S</sup>	60	55	95	40
25	120	175 <sup>A</sup>	85	95	95	100	80 <sup>S</sup>	50 <sup>S</sup>	50	50	55	50	55	60 <sup>S</sup>	55	70 <sup>S</sup>	55	75	65	115	100	75	65 <sup>S</sup>	60
26	50	120 <sup>A</sup>	100	100 <sup>A</sup>	65	95	60	65 <sup>S</sup>	65	60	65	50	50	50 <sup>S</sup>	55	65	85	70	60	95	100	105	80	90
27	65	65	65	55 <sup>S</sup>	80	75 <sup>S</sup>	110	100	55	50	45	50	55	45	65	75	70	90	80	65	60	145	80	55
28	85	75	65	115	95	95	90	50	50	45	55	50	55	50	45	75 <sup>S</sup>	65	85	90	90	90	110	95	90
29	85	90	100	85	110	70	75	90 <sup>S</sup>	65 <sup>S</sup>	45	60	75	75	75	70	70	70	75	75	70	85	70	100	80
30	85	95	90	90	70	95	60	55 <sup>S</sup>	80	65	55	55	60	90	55 <sup>S</sup>	90	70	95	75	95	90	95	90	105
31																								
No.	28	29	30	29	29	29	30	29	29	30	30	30	29	30	30	30	30	30	30	29	28	27	29	28
Median	90	90	95	95	95	95	90	75	65	65	65	70	85	80	80	80	75	90	90	90	90	95	95	90

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 2.0 Mc in 20 sec in automatic operation.

ypF2

K 14

Lat. 31° 12.5' N  
Long. 130° 37.7' E

# Yamagawa

## IONOSPHERIC DATA

135° E Mean Time (GMT. + 9h.)

foF2

Nov. 1960

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	3.8	3.7	3.9	3.8	3.5	3.7	3.6	3.7	3.7	3.9	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
2	4.7	4.1	3.6	3.4	3.2	3.1	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
3	4.6	4.7	3.8	4.0	3.0	3.1	3.6	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4
4	5.3	5.3	5.5	5.5	4.6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
5	6.5	5.6	5.4	5.4	5.6	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	4.0	4.0	4.4	4.1	3.3	3.3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
8	4.7	4.8	4.9	5.3	4.2	4.2	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
9	4.3	4.3	4.3	4.0	4.3	4.0	4.3	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
10	4.4	4.4	4.4	4.5	3.8	3.5	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
11	3.9	3.9	4.1	4.2	3.7	3.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
12	7.0	4.6	3.2	3.1	3.2	3.4	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
13	4.7	4.0	3.9	4.0	3.1	2.7	3.6	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
14	1.08	7.0	1.4	7.7	C	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>5</sub>
15	4.2	3.7	3.4	3.5	2.7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
16	2.4	2.4	2.6	2.6	2.8	2.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
17	3.2	3.3	3.6	4.4	3.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
18	3.7	3.3	3.3	3.3	3.0	3.1	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
19	4.5	3.8	3.6	3.0	3.0	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
20	3.5	3.6	3.6	3.2	3.4	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
21	3.6	3.5	3.5	3.5	3.7	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
22	4.3	4.3	4.1	3.5	3.9	4.6	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
23	3.6	S	3.1	3.1	3.0	3.2	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
24	4.1	4.3	3.3	3.4	3.7	3.4	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
25	3.0	3.2	3.1	3.1	3.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	3.3	3.7	3.3	2.2	2.2	2.5	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
28	3.7	3.2	3.3	3.6	4.2	2.9	3.0	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
29	4.1	4.1	4.1	3.2	3.0	3.0	3.1	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
30	3.6	3.1	3.1	3.2	3.1	2.6	3.0	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
31																								
No.	28	27	28	28	27	26	27	27	29	29	28	26	27	24	25	27	29	28	29	28	25	29	28	27
Median	4.1	4.0	3.6	3.5	3.2	3.1	3.5	3.8	3.5	3.1	3.3	3.0	3.7	3.8	3.8	3.1	3.1	3.8	3.7	3.4	3.1	3.5	3.5	4.1
L.O.	4.6	4.6	4.1	4.2	3.8	3.5	3.7	4.4	4.0	3.3	3.3	3.4	4.4	4.4	4.4	3.9	3.9	4.4	4.0	3.8	3.4	3.9	4.9	4.9
U.O.	3.6	3.5	3.3	3.2	3.0	2.8	3.0	3.0	3.9	3.6	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Q.R.	1.0	1.1	0.8	1.0	0.8	0.7	1.4	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.7	2.1	1.4	2.9	2.7	2.1	2.1	1.7	1.2

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 20.0 Mc in 30 Sec in automatic operation.

foF2



IONOSPHERIC DATA

Lat. 31° 12.5' N  
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT.+9h.)

foF1

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2																								
3																								
4																								
5																								
6								C																
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								
16																								
17								C																
18																								
19																								
20																								
21												C												
22													C											
23													C											
24														C										
25															C									
26																C								
27																	C							
28																		C						
29																			C					
30																				C				
31																					C			
N.o.																								
Median																								

Sweep 1.0 Mc to 20.0 Mc in 30 sec in automatic operation.

The Radio Research Laboratories, Japan.

foF1

Y 2

# IONOSPHERIC DATA

Lat. 31° 12.5' N  
Long. 130° 37.7' E

**Yamagawa**

135° E Mean Time (GMT. + 9h.)

foE

Nov. 1960

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								2.00	2.80	3.10	3.30	3.50 <sup>A</sup>	3.40	3.50	A	A	A	A	A						
2								2.00	2.65	3.10	A	A	A	3.55 <sup>A</sup>	3.20	3.10	2.70	S							
3								B	A	A	A	A	A	3.40	3.30	3.10	2.65	A							
4								B	2.60 <sup>H</sup>	3.05 <sup>H</sup>	3.35	3.50	3.55	3.60	3.50 <sup>R</sup>	A	A	A							
5								B	2.60	3.10	3.30	3.45	3.60 <sup>R</sup>	3.75 <sup>R</sup>	3.55 <sup>R</sup>	3.5	2.65	R							
6								C	2.70	3.05	3.30	3.30	A	A	3.40	3.05 <sup>A</sup>	2.70	A							
7								1.90	A	A	A	3.40 <sup>H</sup>	A	A	A	A	2.70	1.85							
8								B	2.60	3.20	3.40	3.60	3.60	3.60	3.30	3.20	2.70	A							
9								1.90	2.70	3.20	3.40	3.50	3.60	3.50	3.40 <sup>A</sup>	A	A	A							
10								B	2.60	3.10	3.30	3.40	3.60	3.70	A	A	A	A							
11								B	2.80	3.10	3.50	3.60	A	B	B	3.30	2.70 <sup>A</sup>	S							
12								B	2.60	A	A	3.50	A	A	A	A	A	A							
13								1.90	2.60	3.00	3.10	3.20	3.40	A	A	3.00	2.50	B							
14								B	2.35	3.10 <sup>R</sup>	3.30	3.55 <sup>R</sup>	R	B	B	3.25	2.55	S							
15								2.05	2.70	3.20	3.30	3.50	B	B	B	B	2.85	A							
16								B	2.55	3.05	3.20 <sup>C</sup>	3.40	3.50 <sup>A</sup>	3.40 <sup>A</sup>	3.30 <sup>A</sup>	A	A	A							
17								B	2.60	3.00 <sup>C</sup>	3.20	3.25	3.30	3.40	3.10	A	A	A							
18								B	2.50	2.90	3.20	3.40	3.50 <sup>R</sup>	3.40	A	A	A	A							
19								B	2.50	3.00	3.25 <sup>H</sup>	3.40 <sup>R</sup>	3.50	3.50 <sup>R</sup>	3.45 <sup>A</sup>	3.15 <sup>A</sup>	A	A							
20								S	2.50	3.10	3.30	3.40	3.45	3.50	A	A	A	A							
21								B	A	A	A	A	C	C	C	C	C	C							
22								S	2.40	2.90 <sup>H</sup>	3.20 <sup>C</sup>	A	A	A	A	A	A	A							
23								S	2.30	2.80	3.15 <sup>A</sup>	3.25 <sup>A</sup>	3.30	A	A	A	A	A							
24								B	2.40 <sup>H</sup>	2.90	3.15	3.25 <sup>R</sup>	3.30	3.30	A	A	A	A							
25								S	2.30	2.85	3.15	A	A	A	A	A	2.50	A							
26								C	C	2.75	3.00	3.00	A	A	A	3.00	2.50	A							
27								S	2.40	2.85	A	A	A	3.30	3.25	2.90	2.35	A							
28								S	2.40	2.85	3.10	3.25	3.20	A	A	A	A	A							
29								S	2.40	2.80 <sup>H</sup>	3.10	A	A	A	A	2.90	2.95	2.60	A						
30								B	2.25	2.80 <sup>H</sup>	3.20 <sup>H</sup>	3.45	3.45	3.40	3.20	3.00	2.45	A							
31																									
No.					1			6	2.6	2.6	2.4	2.3	1.6	1.6	1.3	1.3	1.5	1							
Median					1.50	1.50		1.95	2.60	3.00	3.20	3.40	3.50	3.40	3.30	3.10	2.65	1.85							

foE

# IONOSPHERIC DATA

Lat. 31° 12.5' N  
Long. 130° 37.7' E

**Yamagawa**

135° E Mean Time (GMT. + 9h.)

**foEs**

**Nov. 1960**

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	E	E	E	E	S	2.5	3.1	3.04	G	3.7	4.3	4.4	4.2	4.4	2.3	8.8M	3.1	5.4	3.9	2.4	S	2.2	
2	S	S	E	E	E	E	S	G	2.7	3.04	3.4	3.6	3.4	3.4	G	G	G	S	S	2.4	S	S	2.0	S	
3	2.7	S	E	E	E	E	S	B	2.9	3.2	3.4	4.5	3.7	3.7	G	2.94	2.14	2.4	2.1	S	S	S	S	S	
4	S	S	E	E	E	E	S	G	G	G	G	G	3.7	3.7	4.3	3.7	2.8	2.3	S	S	S	S	S	S	
5	S	S	2.2	2.1	E	E	S	2.3	G	3.4	3.7	3.6	G	G	3.7	G	3.8	3.3	S	S	2.1	2.2	C	C	
6	C	C	C	C	C	C	C	C	G	3.4	3.5	3.9	3.7	3.8	G	3.8	2.14	2.8	2.5	2.1	S	S	2.4	S	
7	S	S	1.5	E	E	E	S	G	2.8	3.2	3.4	3.4	5.2M	4.8	4.5	3.1	3.4	3.8	4.5M	3.7	S	S	S	S	
8	S	S	E	E	E	E	S	G	2.9	3.5	3.9	3.9	G	3.8	G	3.7	3.0	3.1	3.4	2.9	S	S	S	S	
9	2.5M	E	E	E	E	E	S	G	G	3.04	3.44	4.0	4.0	4.0	5.4	5.4	4.5	5.0	3.6M	5.4	3.0	2.1	S	S	
10	S	S	E	E	E	E	S	G	2.14	G	3.6	G	3.8	G	3.9	3.6	3.9	4.3	3.7M	S	S	S	S	S	
11	S	S	E	E	E	E	S	G	G	3.4	3.8	G	3.7	B	B	G	2.9	G	S	2.4	2.2	S	S	S	
12	S	S	E	E	E	E	S	B	2.8	3.8	3.7	4.1	4.3	4.7	5.0	2.94	3.0	2.3	S	S	S	S	S	S	
13	2.2	2.9	E	E	E	E	S	2.3	G	3.2	3.6	5.3	5.6	6.0	5.0	2.94	G	G	S	S	S	3.0	S	S	
14	S	2.2	E	3.0	1.4	E	S	B	2.6	4.0	7.1M	5.5	5.5	B	B	4.3	5.2	4.7	6.9M	2.5	2.4	2.1	S	S	
15	S	S	E	2.3	2.3	E	E	2.3	3.2	G	G	G	B	B	B	G	G	2.6	2.5	S	S	S	S	S	
16	S	S	E	E	E	E	S	2.6	2.7	3.2	C	3.7	7.4M	9.0M	5.3	3.0	6.0M	9.0M	3.1	2.4	2.5	S	2.0	S	
17	2.6	S	E	E	1.4	E	S	G	G	3.4	3.6	3.6	G	G	3.5	3.5	3.0	2.2	3.3M	2.5	S	S	S	S	
18	S	4.7	E	E	E	E	S	G	G	3.5	3.6	G	3.7	3.7	5.4	5.4	5.0M	4.3M	6.0M	2.2	2.4	2.5	S	S	
19	S	2.3	2.4	E	E	E	S	G	G	G	G	G	3.04	3.04	4.2	3.2	3.2	3.2	2.2	S	S	S	S	S	
20	S	S	E	E	E	E	S	2.8M	G	G	3.6	G	G	G	3.4	3.6	3.0	3.9	S	S	S	S	S	S	
21	S	6.0M	3.0	2.4	E	E	S	G	2.7	3.5	4.1	4.2	C	C	C	C	C	C	C	C	C	C	C	C	
22	S	S	E	E	2.4	2.2	2.5M	G	2.9	2.24	4.0	5.3	5.2	7.1M	6.5M	9.3M	5.0	7.3M	4.3M	3.9	2.3	2.4	S	S	
23	S	S	E	E	E	E	S	2.2	2.24	2.74	3.8	6.4	3.7	4.0	5.9M	3.7	3.6	3.0	2.3	2.3	2.4	S	S	S	
24	S	S	E	E	E	E	S	B	2.4	G	G	G	G	G	3.3	3.4	5.8M	5.44	5.8	2.6	S	S	S	S	
25	S	3.0M	2.4	E	2.3	2.3	2.3	G	G	3.1	G	3.4	3.5	5.8M	5.8	5.53	3.1	2.8	3.6M	3.0M	2.6	S	S	C	
26	C	C	C	C	C	C	C	C	C	3.7	4.0	9.0M	6.3M	4.3	4.4	G	3.6	2.6	S	2.8	2.6	5.7M	S	S	
27	S	S	E	E	E	E	S	G	2.34	C	3.3	3.7	3.4	G	G	2.84	3.1	5.8M	5.7M	3.0M	2.6	2.6	2.6M	S	
28	S	S	E	1.4	2.3	2.4	E	2.6	G	3.2	3.4	3.7	5.6M	5.7M	8.9M	6.4M	5.9M	4.8M	5.9M	4.0M	3.2	2.2	S	S	
29	S	S	E	E	E	S	S	S	G	3.0	3.3	4.9	3.7	4.6M	3.2	G	2.34	2.4	3.1M	3.0	S	2.7M	2.2	S	
30	S	S	E	E	E	E	S	G	G	G	3.3	3.44	G	3.6	G	G	2.7	2.1	2.7	2.2	2.4	S	S	S	
31																									
No.	4	8	27	28	28	25	7	22	29	28	29	30	28	26	26	28	28	29	27	21	20	14	12	6	2
Median	2.6	2.6	E	E	E	E	2.3	G	G	3.0	3.4	3.6	3.7	3.8	4.0	3.6	3.1	3.1	3.4	2.7	2.6	2.4	2.3	2.2	
U.Q	2.6	3.8	E	E	E	E	2.5	G	2.8	3.4	3.7	4.2	4.8	4.7	4.5	4.0	4.8	4.8	4.4	3.4	3.0	2.6	2.6	2.6	
L.Q	2.4	E	E	E	E	E	E	G	G	G	G	G	G	3.2	3.2	G	2.8	2.4	2.6	2.4	2.4	2.4	2.2	2.0	
Q.R	0.2													1.3			2.0	2.4	2.4	1.8	1.0	0.6	0.4	0.6	

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 20.0 Mc in  $\frac{mHz}{sec}$  in automatic operation.

**foEs**

Y 4

# IONOSPHERIC DATA

Lat. 31° 12.5' N  
Long. 130° 37.7 E

## Yamagawa

135° E Mean Time (GMT.+9h.)

fbEs

Nov. 1960

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	G	2.2	2.9 <sup>G</sup>	G	4.1	G	4.0	4.3	5.8	6.2	2.8	3.6	2.3	E	S	1.9	
2	S	S			1.7		S	G	2.3	2.9 <sup>G</sup>	G	3.4 <sup>B</sup>	A			2.0 <sup>G</sup>	G	S	2.4	S	S	1.9	2.0	
3	2.2	S			1.1	S	S	B	G	G	G	4.0	G	3.9	G	G	G	G	S	S	S	S	S	
4	S	S				S	S				G	G		G		3.8	2.7	S	S	S	S	S	S	
5	S	S	2.0	1.8		E	E			3.3	G	G		G		2.0 <sup>G</sup>	G	2.1	1.7	S	E	C	C	
6	C	C	C	C		C	C	C	G	3.4	G	G	3.7	G		3.7	2.0 <sup>G</sup>	G	2.5	3.7 <sup>S</sup>	S	S	2.2	
7	S	S	5.5 <sup>B</sup>			S	S	S	G	G	G	G	4.1	4.2	G	3.3	3.1	2.5	2.7	S	S	S	S	
8	S	S				S	S	S	G	G	3.8	3.8	3.7	3.5	2.8	3.0	2.8	2.6	2.7	S	S	S	S	
9	E	S				S	S	S	1.9 <sup>G</sup>		3.0 <sup>G</sup>	3.3 <sup>G</sup>	3.7	G	4.0 <sup>B</sup>	3.7	3.5	4.5	2.6	4.9	2.2	2.1	S	
10	S	S				S	S	S			G	G	G	3.9	3.9	3.9	4.2	3.7 <sup>S</sup>	S	S	S	S	S	
11	S	S				S	S	S		G	G	G	B	B	B	G	G	S	E	E	2.1	2.1	S	
12	S	S				S	S	B	G	3.2	G	3.9	4.0	3.9	4.0	3.4	G	G	S	S	2.0	S	S	
13	E	2.0	E			S	S	G	G	G	G	5.2	4.6	4.6	2.7 <sup>G</sup>			S	S	S	S	2.7	S	
14	S	E		2.4	1.4 <sup>B</sup>		S	B	G	3.6	4.5	4.7	4.3	B	B	G	4.6	4.6	6.9 <sup>S</sup>	2.3	2.1	2.0	S	
15	S	S		1.8	1.8		S	G	G	G			B	B	B	B	G	G	2.2	2.3	S	S	S	
16	S	S				S	S	G	G	G	C	3.7	5.0	4.4	3.6	G	4.0	6.6	2.7	2.2	2.2	S	2.0	
17	2.2	S			1.3		S			C	G	G	3.5	G	3.5	3.3	G	G	1.8	1.9	S	S	S	
18	S	A				S	S				G	G	G	G	G	G	G	3.2	3.9	1.8	3.3	2.2	S	
19	S	E	E			S	S				G	G	3.0 <sup>B</sup>	3.0 <sup>R</sup>	4.2	G	3.1	S	E	S	S	S	S	
20	S	S				E	S				G		G	G	G	G	2.9	3.6	S	S	S	S	S	
21	S	2.4	2.2	1.8		S	S		G	3.5 <sup>B</sup>	4.1	4.2	C	C	C	C	C	C	C	C	C	C	C	
22	S	S			1.8	E	E		G	2.1 <sup>G</sup>	4.0 <sup>C</sup>	5.0	4.5	4.6	4.0	5.0	3.7	6.6	2.7 <sup>A</sup>	2.7	1.9	E	S	
23	S	S	S			E	S	S	2.2 <sup>G</sup>	2.5 <sup>G</sup>	G	4.4	G	3.9	4.1	3.7	3.6	2.9	1.9	S	E	S	S	
24	S	S				S	S	B	G	G			G	G	G	3.2	3.4	5.3	2.7	2.3	S	S	S	
25	S	1.9	1.9		1.7	1.7	E		G	G	G	G	G	3.8	3.5	G	2.3	G	2.4	1.9	2.6	S	C	
26	C	C	C	C		C	C	C	C	3.5	4.0	6.5	5.2	4.2	3.8		3.6	2.5	S	2.3	2.6 <sup>S</sup>	3.5	S	
27	S	S				S	S		2.1 <sup>G</sup>	C	G	G	G	G	2.7 <sup>G</sup>	2.2	G	G	2.3	2.2	2.2	E	S	
28	S	S		1.3	2.3	E	S	1.9		G	G	G	G	3.5	4.6	G	G	G	2.2 <sup>A</sup>	2.8	2.2	2.0	S	
29	S	S				S	S	S	3.0	G	4.0	G	G	3.6	G	2.2 <sup>G</sup>	2.2	2.2	2.1	S	1.8	E	S	
30	S	S				S	S			G	3.3 <sup>G</sup>			3.6	G	G	G	G	2.1	1.8	E	S	S	
31																								
No.	4	6	6	5	8	4	5	5	15	18	21	23	19	19	19	22	25	25	19	18	13	12	5	2
Median	E	2.0	1.7	1.8	1.7	E	E	G	G	G	G	G	G	3.6	3.8	G	2.9	2.7	2.3	2.2	2.2	1.9	2.0	2.0

The Radio Research Laboratories, Japan.

Y 5

Sweep 1.0 Mc to 20.0 Mc in 30 sec in automatic operation.

fbEs

IONOSPHERIC DATA

Lat. 31° 12.5' N  
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT.+9h.)

f-min

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	F <sub>1.65</sub> <sup>S</sup>	F <sub>1.90</sub> <sup>S</sup>	1.80	1.80	1.30	1.45	F <sub>1.60</sub> <sup>S</sup>	1.70	1.60	1.80	2.10	2.20	2.20	2.25	1.90	1.80	1.70	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	
2	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.30	1.70	E	1.80	F <sub>1.80</sub> <sup>S</sup>	1.70	1.80	1.90	1.90	1.90	1.90	2.00	2.05	1.80	1.75	2.10	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.75</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
3	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.70	E	E	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	2.00	1.70	1.70	1.90	1.85	2.00	2.00	1.70	1.60	1.50	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.75</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
4	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.75</sub> <sup>S</sup>	1.70	1.70	E	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.80	1.75	1.80	1.90	1.80	2.00	2.00	1.90	1.80	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.75</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
5	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.70	1.70	1.70	1.60	F <sub>1.70</sub> <sup>S</sup>	1.60	1.70	1.70	1.80	1.90	2.10	2.10	1.90	2.20	1.90	1.90	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>
6	C	C	C	C	C	C	C	C	1.60	1.80	2.00	1.85	2.25	2.20	1.90	1.80	1.60	1.15	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
7	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.85</sub> <sup>S</sup>	1.20	1.60	1.25	1.20	F <sub>1.70</sub> <sup>S</sup>	1.80	1.60	1.80	1.85	2.10	2.50	2.00	2.05	1.80	1.70	1.60	F <sub>1.60</sub> <sup>S</sup>	1.25	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
8	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	1.20	1.70	1.30	1.20	F <sub>1.70</sub> <sup>S</sup>	1.80	1.70	1.75	1.80	1.80	2.40	2.20	1.90	1.90	1.75	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
9	F <sub>1.70</sub> <sup>S</sup>	1.70	1.70	1.10	1.20	1.80	F <sub>1.70</sub> <sup>S</sup>	1.70	1.80	1.70	1.90	1.85	2.15	1.90	2.20	1.85	1.70	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
10	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	1.20	1.70	E	1.80	F <sub>1.75</sub> <sup>S</sup>	1.80	1.70	1.90	2.20	1.90	1.90	1.90	2.20	2.05	1.90	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
11	F <sub>1.90</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	1.70	1.30	1.30	1.70	F <sub>1.70</sub> <sup>S</sup>	1.90	2.05	1.90	2.50	1.90	2.20	1.010	5.20	2.50	1.95	1.90	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
12	F <sub>1.60</sub> <sup>S</sup>	1.20	1.30	1.80	1.30	1.70	F <sub>1.70</sub> <sup>S</sup>	2.00	1.80	1.80	2.00	2.20	2.20	2.20	1.80	1.80	1.85	1.75	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.75</sub> <sup>S</sup>	F <sub>1.50</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
13	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	1.65	1.70	1.50	1.70	F <sub>1.80</sub> <sup>S</sup>	1.70	1.80	1.80	2.00	2.00	2.10	2.10	2.05	1.80	1.70	1.75	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.85</sub> <sup>S</sup>	F <sub>1.85</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	
14	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.90</sub> <sup>S</sup>	1.70	E	E	1.70	F <sub>1.50</sub> <sup>S</sup>	2.15	1.70	1.80	2.10	2.20	2.60	2.20	4.50	2.95	1.70	1.80	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
15	F <sub>1.75</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	1.60	1.70	1.70	1.60	1.70	1.80	1.70	1.90	1.80	1.80	10.20	8.05	4.70	3.80	2.20	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	
16	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	1.10	1.15	1.70	1.40	F <sub>1.60</sub> <sup>S</sup>	1.70	1.80	1.80	1.85	2.20	2.05	1.85	2.20	1.60	1.60	1.60	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	
17	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.10	E	E	1.60	F <sub>1.70</sub> <sup>S</sup>	1.70	1.80	2.10	1.85	2.00	2.10	1.90	1.80	1.80	1.70	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	
18	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	1.30	1.70	1.25	1.20	F <sub>1.70</sub> <sup>S</sup>	1.70	1.65	1.80	1.90	1.85	2.20	1.85	1.90	1.60	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.85</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	
19	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.70	1.20	1.35	1.70	F <sub>1.80</sub> <sup>S</sup>	1.80	1.80	1.85	2.00	2.00	2.20	2.20	2.20	2.20	1.90	2.10	F <sub>1.90</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
20	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.80	1.30	1.25	1.70	F <sub>1.80</sub> <sup>S</sup>	1.80	1.85	1.70	2.00	1.90	2.05	2.20	1.90	1.80	1.80	1.80	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
21	F <sub>1.90</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	1.70	1.60	1.70	1.80	F <sub>1.85</sub> <sup>S</sup>	1.80	2.20	2.60	3.20	2.60	C	C	C	C	C	C	C	C	C	C	C	C	F <sub>1.70</sub> <sup>S</sup>	
22	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.25	1.80	1.70	1.80	F <sub>1.80</sub> <sup>S</sup>	1.90	1.70	1.80	1.90	2.00	2.00	2.00	2.00	2.00	1.70	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.75</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.90</sub> <sup>S</sup>	
23	F <sub>1.90</sub> <sup>S</sup>	F <sub>2.10</sub> <sup>S</sup>	F <sub>1.50</sub> <sup>S</sup>	1.30	1.50	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	1.75	1.80	1.80	1.85	1.90	2.00	1.85	1.85	1.60	1.60	F <sub>1.65</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
24	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.70	1.30	1.70	1.70	F <sub>1.80</sub> <sup>S</sup>	1.90	F <sub>1.80</sub> <sup>S</sup>	1.70	1.80	1.90	1.90	1.85	1.70	1.90	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	
25	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.60	1.40	1.25	1.60	F <sub>1.70</sub> <sup>S</sup>	1.80	1.80	1.75	1.90	1.70	2.00	2.00	2.00	1.80	1.90	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	C	
26	C	C	C	C	C	C	C	C	1.85	1.80	1.95	1.90	1.90	1.90	1.80	1.90	1.65	F <sub>1.60</sub> <sup>S</sup>	1.10	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.65</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	
27	F <sub>1.90</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.60	1.20	1.30	1.80	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.80	1.80	1.90	1.90	1.90	1.90	1.80	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	
28	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.90</sub> <sup>S</sup>	1.70	1.15	E	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	1.80	1.70	1.85	1.80	1.90	1.90	2.25	2.05	1.90	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
29	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	1.40	1.20	1.25	F <sub>1.90</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	1.90	1.70	1.80	1.85	1.85	1.85	1.90	1.80	1.90	1.70	F <sub>1.65</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.80	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.60</sub> <sup>S</sup>	
30	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	1.40	1.30	1.30	1.70	F <sub>1.80</sub> <sup>S</sup>	1.70	1.75	1.75	1.90	2.00	2.20	1.90	1.90	2.20	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	
31																										
No.	28	28	28	28	28	27	28	28	28	30	30	30	29	29	29	29	29	29	29	29	29	29	29	28	28	
Median	F <sub>1.80</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	1.60	1.35	1.30	1.70	F <sub>1.70</sub> <sup>S</sup>	1.80	1.75	1.80	1.90	1.90	2.10	2.00	1.90	1.85	1.70	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>	F <sub>1.70</sub> <sup>S</sup>		

Sweep 1.0 Mc to 200 Mc in 30 min in automatic operation.

The Radio Research Laboratories, Japan.

Y 6

# IONOSPHERIC DATA

Lat. 31° 12.5' N  
Long. 130° 37.7' E

**Yamagawa**

135° E Mean Time (GMT. + 9h.)

(M3000)F2

Nov. 1960

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	255	255	290	265	245	270	250	225	225	310 <sup>H</sup>	310 <sup>H</sup>	315	310	320 <sup>H</sup>	315	320	330	315	295	290	320	290	270	255
2	300	270	285	295	270	255	270	305	345	345	335	315 <sup>H</sup>	305 <sup>H</sup>	310 <sup>H</sup>	310 <sup>H</sup>	315	320	330	330	270	280	290	295	260	
3	275	220	275	225	255 <sup>H</sup>	270	305	340	345	325	310 <sup>H</sup>	320	305 <sup>H</sup>	300 <sup>H</sup>	310 <sup>H</sup>	305	315	315	315	285	280	275	285	285	
4	290	285	310	325	330	270	290	335	330	330	310	315	290	34	34	34	305	295	285	295	290	330	275	270	
5	305	280	260	260	295	220	285	325	325	325	310	320	300 <sup>H</sup>	300 <sup>H</sup>	300 <sup>H</sup>	300 <sup>H</sup>	320	320	305	310	300	300	300	C	
6	C	C	C	C	C	C	C	C	340	320	330	320	285	305 <sup>H</sup>	300 <sup>H</sup>	295	300 <sup>H</sup>	310	315	305	305	310	320	275	
7	255	265	320	325	305	260	275	345	340	320	310 <sup>H</sup>	325 <sup>H</sup>	295	300 <sup>H</sup>	300	295	300	305	305	310	305	305	305	275	255
8	270	280	305	310	345	270	255	310	335	330	320	305	270 <sup>H</sup>	300 <sup>H</sup>	300	305	305	325	315	310	290	300	285	265	
9	265	265	275	270	300	330	270	330	340	330	315 <sup>H</sup>	315	300 <sup>H</sup>	290 <sup>H</sup>	34	300 <sup>H</sup>	300	305	310	280	290	315	300	235	
10	240	255	265	290	315	275	305	335	325	325	320	310 <sup>H</sup>	285	290	295	295	305	315	300	295	300	315	285	250	
11	255	255	290	285	260	260	270	315	335	330	310	305	300 <sup>H</sup>	295	305	300	295	300	295	285	305	265	270	250	
12	310	305	260	240	250	260	280	320	330	330	315	305	290	295	300	300	295	305	305	315	280	285	280	250	
13	275	260	250	290	310	200	315	335	285	240 <sup>H</sup>	340 <sup>H</sup>	340 <sup>H</sup>	285	34	34	275	250	230	255	R	R	250	235	R	
14	300	205 <sup>H</sup>	275	355	C	F	F	F	315	315	330	330	340	R	310	305	310	325	330	315	315	320	315	305	
15	300	280	280	345	335	F	F	F	350	325 <sup>H</sup>	325 <sup>H</sup>	320	R	R	R	320	305	315	315	330	315	315	350	300	
16	240	230	245	275	230	235	300	315	315	320	285	R <sup>H</sup>	280 <sup>H</sup>	275	280	285	320	295	275	265	295	325	345	360	
17	230	245	275	330	340	290	250	305	345	340	325	305 <sup>H</sup>	305	305	315	315	315	340	305	285	320	320	270	270	
18	275	280 <sup>H</sup>	260	280	280	245	285	335	350	330	320	315 <sup>H</sup>	305	305	34	34	315	340	290	300	300	310	275	275	
19	280	305	285	295	275	260	280	335	345	340	340 <sup>H</sup>	320	315	315	320	315	330	340	340	305	315	285	260	255	
20	270	285	305	280	295	265	275	320	335	340	335	310	310	315	310	320	325	325	325	325	305	295	275	270	
21	260	270	270	275	280	265	265	305	345	325	335	305	C	C	C	C	C	C	C	C	C	C	C	240	
22	255	260	280	245	230	240	235	275	325	300	300	305	305	310	320	325	320	335	315	300	300	285	300	275	
23	285	290	270	255	265	265	310	365	345	295 <sup>H</sup>	310 <sup>H</sup>	315	305 <sup>H</sup>	320	305	325	325	345	315	300	330	315	320	255	
24	280	295	275	270	280	280	310	330	325	325	325	335	315 <sup>H</sup>	305 <sup>H</sup>	315 <sup>H</sup>	320	335	345	325	325	320	325	340	250	
25	275	280	295	275	255	245	275	315	355	350	315	335 <sup>H</sup>	325 <sup>H</sup>	330	300	315	325	325	305	305	295	285	285	C	
26	C	C	C	C	C	C	C	C	330	330	335	325	330	315	325	335	305	305	325	300	315	290	335	290	
27	275	290	345	335	275	255	275	300	335	345	335 <sup>H</sup>	310 <sup>H</sup>	310 <sup>H</sup>	310 <sup>H</sup>	325 <sup>H</sup>	335	325	325	345	335	315	290	280	275	
28	305	295	275	285	320	275 <sup>H</sup>	265	325	345	325	320	34	340	315	325	340	340	325	330	295	305	275	275	270	
29	270	275	300	325	305	280	280	310	330	340 <sup>H</sup>	330	330	310	335 <sup>H</sup>	330	335	330	345	345	320	300	290	310	295	260
30	290	325	290	305	335	255	260	320	355	340	345	330 <sup>H</sup>	320 <sup>H</sup>	310 <sup>H</sup>	315	340	340	340	330	330	330	295	310	290	
31																									
No.	28	27	28	28	27	26	27	27	29	29	28	26	27	24	25	27	29	28	29	28	25	29	28	27	
Median	275	280	280	270	295	260	275	325	335	325	320	315	305	305	310	315	320	325	315	300	300	300	290	270	

Sweep 1.0 Mc to 20.0 Mc in 3.0 sec in automatic operation.

(M3000)F2

The Radio Research Laboratories, Japan.

**Y**

IONOSPHERIC DATA

Lat.  $31^{\circ} 12.5' N$   
 Long.  $130^{\circ} 37.7' E$

Yamagawa

(M3000)F1

135° E Mean Time (GMT. + 9h.)

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2																								
3																								
4																								
5																								
6								C																
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								
16																								
17									C															
18																								
19																								
20																								
21												C												
22													C											
23													C											
24													C											
25													C											
26								C																
27									C															
28										C														
29																								
30																								
31																								
No.																								
Median																								

Sweep 1.0 Mc to 20.0 Mc in 30 sec in automatic operation.

The Radio Research Laboratories, Japan.

(M3000)F1

Y 8

# IONOSPHERIC DATA

Lat. 31° 12.5' N  
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT.+9h.)

R'F2

Nov. 1960

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1																									
2																									
3																									
4																									
5																									
6								C																	
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16									C																
17																									
18																									
19																									
20													C												
21													C												
22													C												
23													C												
24													C												
25													C												
26								C					C												
27								C					C												
28													C												
29													C												
30													C												
31													C												
No.																									
Median																									

Sweep 1.0 Mc to 20.0 Mc in 30 sec in automatic operation.

The Radio Research Laboratories, Japan.

R'F2

Y 9



Lat. 31° 12.5' N  
Long. 130° 37.7' E

**Yamagawa**

**IONOSPHERIC DATA**

135° E Mean Time (GMT.+9h.)

**R'F**

**Nov. 1960**

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	255	340	330	265	280	350	310	240	215	235	230	230	240	240	230	230	245	250	220	275	260	240	240	280
2	270	250	275	260	280	350	325	260	245	240	230	220	205	200	200	240	230	230	210	250	280	250	255	310
3	320	240	250	245	200	300	260	240	235	230	230	245	210	205	215	245	240	230	220	220	255	255	250	260
4	250	285	250	250	230	280	280	240	235	230	230	230	230	230	255	240	230	215	250	245	240	230	260	230
5	260	265	335	325	250	235	270	245	240	245	240	230	210	245	225	240	230	230	240	225	240	250	C	C
6	C	C	C	C	C	C	C	C	230	240	250	230	240	225	200	245	230	245	230	230	230	225	240	280
7	340	315	255	250	250	340	300	240	230	200	230	230	240	250	230	240	240	240	230	245	235	230	250	310
8	310	290	255	260	220	240	325	255	245	240	245	240	205	215	250	240	230	230	225	250	220	230	240	290
9	325	310	305	275	255	250	260	230	225	205	210	240	210	240	255	245	235	230	220	275	255	240	230	270
10	320	305	295	280	245	300	260	235	230	230	230	230	220	245	250	245	230	230	225	230	230	230	240	305
11	340	325	290	290	250	325	320	255	245	240	240	240	220	210	260	245	240	225	240	225	240	245	280	310
12	250	210	300	360	350	335	300	255	230	230	240	225	230	220	250	240	240	225	225	225	225	240	255	290
13	290	320	350	285	245	585	250	205	240	280	250	240	240	250	250	240	270	280	310	285	240	220	340	255
14	210	340	320	210	370	400	250	210	230	240	250	250	250	275	245	230	250	230	250	230	240	250	240	270
15	265	275	305	240	250	310	270	235	220	190	210	225	220	270	250	240	230	225	225	230	210	235	220	260
16	420	440	370	290	400	415	290	245	245	250	250	235	240	250	245	250	245	280	250	250	270	235	220	260
17	310	A	300	250	230	270	390	270	245	240	230	220	230	245	240	240	235	215	200	250	245	230	220	220
18	310	300	310	310	295	340	300	240	230	240	230	220	240	230	240	225	230	235	215	200	250	230	235	290
19	260	255	270	260	290	350	320	240	235	245	235	230	240	230	225	225	230	220	250	230	255	250	240	270
20	310	295	250	260	270	320	320	255	240	240	240	230	245	240	230	245	235	220	210	220	240	230	250	310
21	320	350	325	310	295	300	335	290	240	245	250	250	C	C	C	C	C	C	C	C	C	C	300	300
22	340	325	275	395	420	395	340	290	250	245	250	240	240	245	250	245	230	245	205	250	240	230	250	300
23	300	290	265	300	350	355	260	210	225	220	220	245	200	250	240	245	240	220	210	280	235	225	230	270
24	305	255	310	320	300	280	270	230	230	230	230	230	210	205	205	240	230	250	255	240	220	210	230	370
25	330	310	295	300	355	395	345	250	225	230	220	225	200	240	245	250	240	225	210	210	245	255	250	C
26	C	C	C	C	C	C	C	C	C	245	230	265	255	245	250	235	230	220	205	230	250	295	240	240
27	300	280	240	245	270	375	320	280	250	240	220	210	210	220	230	230	235	225	220	235	230	230	255	305
28	270	290	315	300	250	340	345	245	240	230	225	205	205	225	240	235	225	200	200	255	240	250	250	250
29	290	300	255	225	260	305	300	265	240	220	225	240	225	200	205	240	230	225	210	225	240	230	230	300
30	295	250	265	270	225	320	340	255	220	230	235	225	210	205	225	245	230	225	220	210	230	245	230	300
31																								
No.	26	25	28	28	27	28	26	28	29	30	30	28	29	29	29	29	29	29	29	29	29	29	28	27
Median	300	290	295	270	260	330	300	245	235	240	230	230	240	240	240	240	235	225	220	235	240	235	240	280

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 20.0 Mc in 30 min sec in automatic operation.

**R'F**

Nov. 1960

R'ES

135° E Mean Time (GMT + 9h.)

Yamagawa

Lat. 31° 12.5' N  
Long. 130° 37.7' E

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	E	E	E	E	S	145	110	120	G	120	125	125	115	115	110	110	110	110	110	110	110	110	105
2	S	S	E	E	100	E	S	G	120	115	110	110	105	110	G	G	G	S	S	110	S	S	100	100	100
3	100	S	E	E	105	S	S	B	115	110	110	110	110	G	G	105	100	100	100	S	S	S	S	S	S
4	S	S	E	E	E	E	S	100	G	G	G	G	135	130	150	120	120	115	S	S	S	S	S	S	S
5	S	S	105	105	E	E	S	105	G	165	150	160	G	G	155	G	135	130	S	S	S	105	110	C	C
6	C	C	C	C	C	C	C	C	G	125	125	110	115	110	G	110	105	100	100	100	S	S	S	105	S
7	S	S	105	E	E	E	S	G	115	110	110	110	110	110	110	110	140	120	120	115	S	S	S	S	S
8	S	S	E	E	E	E	S	G	175	160	G	145	G	120	G	130	130	110	105	105	S	S	S	S	S
9	105	E	E	E	E	E	S	G	G	G	110	110	135	130	130	125	120	115	105	105	S	S	S	S	S
10	S	S	E	E	E	E	S	G	110	G	125	G	150	G	120	120	110	110	S	S	S	S	S	S	S
11	S	S	E	E	E	E	S	G	170	150	G	110	B	B	G	110	G	S	105	105	100	S	S	S	S
12	S	E	E	E	E	E	S	B	130	120	110	120	110	115	120	120	110	110	S	S	S	105	S	S	S
13	105	105	105	E	E	E	S	100	G	130	125	115	115	115	110	110	G	G	S	S	S	S	S	135	S
14	S	120	E	105	150	E	S	B	150	155	135	150	145	B	B	150	135	145	140	125	S	S	S	110	105
15	S	S	E	105	110	E	S	175	170	G	G	G	B	B	B	G	105	105	S	S	S	S	S	S	S
16	S	S	E	E	E	E	S	150	145	140	C	130	120	120	120	100	100	100	100	100	100	110	S	S	S
17	110	S	E	E	105	E	S	G	G	C	125	125	130	130	125	120	120	120	110	110	S	S	S	S	S
18	S	105	E	E	E	E	S	G	G	G	150	150	G	G	105	125	100	100	120	100	110	110	110	110	S
19	S	110	105	E	E	E	S	G	G	G	G	G	110	110	105	120	S	100	S	S	S	S	S	S	S
20	S	S	E	E	E	E	S	G	G	G	145	G	G	G	120	120	125	120	S	S	S	S	S	S	S
21	S	105	105	105	E	E	S	G	125	120	115	110	C	C	C	C	C	C	C	C	C	C	C	C	S
22	S	S	E	E	E	105	110	150	105	140	110	110	110	110	110	105	105	105	105	105	105	105	105	105	S
23	S	S	S	E	E	120	S	120	110	105	105	135	130	100	140	100	100	100	100	100	S	S	115	S	S
24	S	S	E	E	E	E	S	B	110	G	G	G	G	G	105	110	105	110	110	S	S	S	S	S	S
25	S	110	105	E	E	105	105	G	155	G	105	110	110	110	110	105	105	105	105	105	105	105	105	105	C
26	C	C	C	C	C	C	C	C	125	120	110	110	105	105	G	125	115	S	100	120	110	S	S	S	S
27	S	S	E	E	E	E	S	G	125	C	110	110	110	G	G	110	105	105	105	105	105	105	105	105	100
28	S	S	E	110	105	105	E	105	G	125	130	125	120	110	110	120	130	120	105	100	105	105	105	105	S
29	S	S	E	E	E	S	S	G	130	140	105	105	105	125	G	105	105	100	105	S	S	105	105	105	S
30	S	S	E	E	E	E	S	G	145	105	105	105	130	G	G	105	105	100	105	105	105	105	105	105	S
31	S	S	E	E	E	E	S	G	145	105	105	105	130	G	G	105	105	100	105	105	105	105	105	105	S
No.	4	6	6	5	8	4	5	5	15	19	22	23	22	19	20	22	26	25	21	20	14	12	6	2	
Median	105	110	105	105	105	110	145	125	125	125	125	110	110	115	110	120	110	110	105	105	105	105	105	100	

R'ES

Sweep 1.0 Mc to 200 Mc in 30 sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 11

Lat. 31° 12.5' N  
Long. 130° 37.7' E

Yamagawa

IONOSPHERIC DATA

135° E Mean Time (GMT.+9h.)

Types of Es

Nov. 1960

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								h, l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
2					f <sub>2</sub>				l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
3	f <sub>2</sub>				f <sub>2</sub>				l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
4						f <sub>2</sub>			l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
5							f <sub>2</sub>		l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
6									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
7									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
8									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
9									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
10									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
11									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
12									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
13									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
14									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
15									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
16									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
17									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
18									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
19									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
20									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
21									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
22									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
23									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
24									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
25									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
26									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
27									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
28									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
29									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
30									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
31									l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	l	
No.																									
Median																									

Sweep 1.0 Mc to 20.0 Mc in 30 sec in automatic operation.

The Radio Research Laboratories, Japan.

Types of Es

Y 12

## SOLAR RADIO EMISSION 200 Mc/s

Flux in  $10^{-22}$  w.m. $^{-2}$  (c/s) $^{-1}$ , 2 polarizations

HIRAISO

Time in U.T.

Nov. 1960	Steady Flux					Variability				
	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
1	7	11	(14)	-	10	1	1	(1)	-	1
2	8	8	9	-	8	0	0	0	-	0
3	8	8	9	-	8	0	0	0	-	0
4	7	8	9	-	8	0	0	0	-	0
5	8	8	8	-	8	0	0	0	-	0
6	9	9	(9)	-	9	0	0	(0)	-	0
7	10	9	9	-	9	0	0	0	-	0
8	11	9	9	-	9	0	0	0	-	0
9	9	9	7	-	9	0	0	0	-	0
10	8	8	8	-	8	0	1	0	-	0
11	37	>2075	100	55	>774	2	2	1	2	2
12	49	37	22	39	41	2	2	2	1	2
13	24	12	9	-	20	1	0	0	-	1
14	22	241	13	-	102	1	2	0	-	1
15	175	148	82	-	146	1	2	1	-	1
16	8	9	9	-	9	0	0	0	-	0
17	9	8	9	-	8	0	0	0	-	0
18	7	8	(7)	-	8	0	0	(0)	-	0
19	8	8	(9)	-	8	0	0	(0)	-	0
20	8	9	9	10	9	0	0	0	1	0
21	9	9	11	-	9	1	1	1	-	1
22	9	9	9	-	9	0	0	0	-	0
23	10	8	8	-	9	0	0	0	-	0
24	8	8	(8)	-	8	0	0	(0)	-	0
25	8	8	9	-	8	0	0	0	-	0
26	11	7	7	-	9	0	0	0	-	0
27	8	8	(7)	-	8	0	0	(0)	-	0
28	8	8	8	-	8	0	0	0	-	0
29	7	7	5	-	6	0	0	0	-	0
30	8	7	8	-	8	0	0	0	-	0

## Outstanding Occurrences

Nov. 1960	Start- time	Dura- tion	Type	Max. Int.		Max. Time	Remarks
				Inst.	Smd.		
11	~0230	>300	CD/9	>9000	>2500	-	off scale, interrupted by sunset
14	~0318	~50	CD/8	1000	300	0344	
	~0416	~70	CD/8	800	400	0452	
15	0220.3	~40	ECD/9	>9000	>4000	-	off scale
		~65		400	250	-	
		~40		450	200	0434	
		~35		1500	600	0500	
		~60		400	200	0555	

## RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Nov. 1960	Whole Day Index	L. N.			W W V				S. F.				W W V H				Warning				Principal magnetic storms		
		06	12	18	00	06	12	18	00	06	12	18	00	06	12	18	00	06	12	18	Start	End	ΔH
		12	18	24	06	12	18	24	06	12	18	24	06	12	18	24	06	12	18	24			
1	3-	2	2	2	2	Z	Z	3	2	1	2	2	1	2	(2)	2	N	N	N	N			
2	3o	3	2	2	2	Z	Z	2	2	3	(2)	2	1	2	2	2	N	N	N	N			
3	2+	2	2	2	2	Z	Z	1	1	3	(3)	2	2	2	2	2	N	N	N	N			
4	2+	2	3	3	3	Z	Z	2	3	1	1	2	2	1	2	2	N	N	N	N			
5	2+	2	1	2	4	Z	Z	1	3	1	2	3	1	2	1	1	N	N	N	N			
6	2o	1	1	2	1	Z	Z	2	3	(3)	3	2	2	2	2	2	N	N	N	N			
7	2-	2	2	2	1	Z	Z	1	2	2	2	1	1	2	1	1	N	N	N	N			
8	3-	2	3	3	2	Z	Z	1	3	3	2	2	1	2	2	1	N	N	N	N			
9	2o	1	2	3	1	Z	Z	1	2	3	2	2	1	1	1	2	N	N	N	N			
10	1+	1	2	1	1	Z	Z	1	3	1	1	1	2	2	1	2	N	N	N	N	0717	---	
11	2-	1	1	1	1	Z	1	1	3	3	2	3	3	1	3	3	N	N	N	N	0034	2300	132 <sup>y</sup>
12*	3-	2	2	3	1	Z	Z	3	2	3	2	2	2	1	2	2	N	U	U	U	1348	---	
13*	3+	3	2	3	4	Z	Z	5	1	2	3	4	2	1	1	2	W	W	W	W	---	---	
14*	3o	2	2	3	5	Z	Z	3	4	2	(1)	3	3	2	2	3	W	W	U	U	---	2300	417 <sup>y</sup>
[15]*	3o	1	3	4	5	Z	Z	3	3	2	3	2	4	1	4	(4)	U	U	W	W	1303	---	
[16]*	2+	3	2	3	3	Z	Z	3	2	1	1	1	2	1	2	1	W	W	W	W	---	---	
[17]*	3-	3	2	2	3	Z	Z	3	2	2	2	1	1	2	3	2	U	U	U	U	---	---	
18	3o	2	2	3	2	Z	Z	3	3	2	2	(2)	1	2	3	2	U	N	N	N	---	0300	225 <sup>y</sup>
19	2+	2	1	1	3	Z	Z	2	2	2	2	2	2	2	2	1	N	N	N	N			
20	2o	3	2	(2)	1	Z	Z	1	1	2	2	2	1	1	1	2	N	N	N	N			
21	3o	2	2	3	2	Z	Z	2	2	(3)	2	3	1	1	1	3	N	N	U	U	0300	---	
22	3+	2	3	4	3	Z	Z	2	3	-	-	-	2	2	3	2	U	U	U	U	---	2100	81 <sup>y</sup>
23	3o	2	2	(3)	2	Z	Z	2	2	(2	2)	2	2	2	(2	2)	N	N	N	N			
24	3-	2	3	3	4	Z	Z	1	2	2	2	(2)	1	2	2	3	N	N	N	N	1230	---	
25	3-	2	3	3	(2)	Z	Z	2	2	1	2	2	2	2	2	2	N	N	N	N	---	---	
26	3o	3	C	C	3	Z	Z	3	2	(3)	3	(3)	1	(1)	2	2	N	U	U	U	---	1800	105 <sup>y</sup>
27	3+	4	4	3	2	Z	Z	2	3	(3	3)	2	1	2	3	2	U	U	U	U			
28	1+	2	1	2	2	Z	Z	1	1	2	1	1	2	1	1	2	U	U	U	U			
29	2o	3	3	2	1	Z	Z	1	2	-	2	1	1	2	2	1	N	N	N	N			
30	2+	2	2	3	1	Z	Z	1	2	3	2	2	1	2	2	1	N	N	N	N			

## SUDDEN IONOSPHERIC DISTURBANCES

(S. I. D. )

HIRAISO

Time in U.T.

Nov. 1960	S W F				S E A			Correspondence						
	Drop-out WS	SF	HA	TO LN	Start- time	Dura- tion	Type	Imp.	Start- time	Dura- tion	Imp.	Flare	Solar Noise	Mag.
4	19				23.28	-	S	2				x		
11	30	32		30	03.13	44	Slow	3					x	
14		25			00.10	35	S	2-				x	x	
14	-	47		27	03.00	83	Slow	3+				x	x	
14			14	11	05.20	13	S	2-				x	x	
15	-	70	>15	>22'	02.20	68	S	3+				x	x	x

PROVISIONAL IONOSPHERIC DATA

Lat. 69° 00.4' S  
Long. 39° 35.4' E

Showa Base

45° E Mean Time (G.M.T.+3h.)

foF2

Jul. 1960

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	B	B	24F	24F	B	B	B	B	B	B	B	54R	35R	35F	32C	36F	60F	60F	52F	B	R	B	B	B
2	B	B	32F	B	B	B	B	B	B	B	B	B	77R	70R	70R	70R	B	36F	B	B	B	B	B	B	36R
3	36R	B	B	B	B	37F	B	B	42F	B	43F	59F	73F	80F	71F	78F	B	70F	R	B	17	B	B	25R	B
4	F	B	B	B	B	B	B	B	B	B	B	48F	B	B	81R	78F	67F	70F	63F	42R	B	B	B	B	442F
5	39F	F	B	B	B	B	B	B	B	40F	B	51F	60F	B	62R	86R	83F	87R	R	52F	B	B	B	B	B
6	B	B	B	B	B	B	B	B	B	B	41F	53F	72F	C	72F	B	68R	80F	B	B	B	B	B	B	32F
7	B	B	B	43R	23R	26F	24F	28F	27F	30F	41F	33F	C	78F	72F	B	59F	45F	40F	29F	B	18F	R	R	R
8	B	B	B	34F	31F	30F	32F	36F	32F	32F	47F	56F	61F	66F	71F	56F	44F	41F	35F	22F	B	B	B	B	B
9	B	B	29F	22F	24F	20F	B	39F	37F	38F	45F	57F	62F	65F	80	63F	56F	39F	33F	28F	B	B	B	B	B
10	17R	B	B	35F	F	F	B	B	47F	43F	47F	60F	63F	71F	89F	72F	57F	54F	39F	B	19F	B	B	B	B
11	B	F	B	F	B	B	B	B	42F	48F	54F	62R	71F	67	73	78	76	61	51F	33F	B	B	R	R	B
12	F	B	B	B	F	B	B	B	43F	B	42R	51F	62R	77F	87F	B	76F	67F	52F	B	B	B	R	R	B
13	B	B	B	B	B	B	B	B	46F	B	50F	50F	60F	69F	70F	64R	72R	76F	R	B	B	B	B	B	B
14	B	B	B	B	R	B	B	33F	B	B	47F	56F	72F	62F	B	70F	80R	99F	73F	B	B	F	B	B	B
15	F	F	F	37F	F	F	F	F	B	41F	40F	45R	45F	45F	B	B	51F	F	F	F	B	B	B	B	B
16	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	42F	47F	49F	B	B	B	B	B	B
17	B	B	B	B	B	B	B	B	B	B	B	46R	B	B	B	52F	47F	52F	40F	B	B	B	B	B	B
18	B	B	B	B	B	B	B	B	B	B	B	46R	52F	57F	61F	60F	60F	59F	48F	32R	B	B	B	B	B
19	43F	F	B	B	41F	39F	35F	43F	44F	39F	B	B	B	B	96F	74F	103F	B	B	R	B	39F	52F	B	B
20	B	B	B	B	B	B	B	B	B	36F	44F	51F	63F	74	69F	79F	B	72R	39R	26F	B	B	B	B	B
21	B	F	B	B	B	B	B	B	B	B	B	44F	54F	63F	81F	72F	66R	B	S	29F	B	B	B	B	B
22	B	B	B	B	B	B	B	B	B	B	B	B	57F	75F	75F	91	B	R	B	B	B	B	B	B	B
23	B	B	B	B	B	B	B	B	40F	B	B	B	61F	76F	S	70F	50F	S	34	B	B	B	B	B	B
24	B	B	B	B	B	B	B	37F	B	41R	42F	51F	70F	92F	75F	75F	71	60F	46F	22F	17F	R	B	B	B
25	B	B	B	B	B	B	B	37F	39F	33F	50F	66F	73F	67F	80F	74F	58	44F	31F	19F	R	15R	R	B	B
26	B	B	B	B	B	B	B	B	32F	32F	48F	55F	65F	63F	65F	72F	71F	63R	B	B	B	B	B	B	B
27	B	B	20F	B	B	B	B	B	39F	26F	47F	56F	64F	72R	74F	64F	51F	53F	41F	22F	17F	B	B	17F	16F
28	20F	B	B	B	B	B	B	20	21R	23F	31F	48F	71F	73F	70F	72F	58F	69F	50F	B	B	B	B	B	B
29	B	B	B	B	F	B	B	F	B	B	B	50F	57F	65F	64F	70F	61F	545	36F	B	B	B	B	B	B
30	B	B	B	B	25F	B	B	30F	B	B	40F	46F	54F	59F	64F	83F	87R	B	44F	B	B	B	B	B	B
31	B	B	B	F	B	B	B	B	B	B	B	B	B	B	B	63F	90F	62F	F	B	B	C	C	C	B
No.	5	1	3	7	6	4	5	9	11	14	18	24	24	23	24	27	26	25	20	13	4	3	4	3	3
Median	3.3	2.9	2.2	3.4	2.8	3.4	3.2	3.7	4.0	3.7	4.6	5.2	6.2	6.7	7.4	7.2	6.4	6.1	4.2	2.9	1.7	1.8	2.8	3.6	
U.Q.	3.8		2.7	3.7	3.6	3.8	4.6	3.9	4.4	4.1	4.8	5.6	7.0	7.4	8.0	7.8	7.6	7.1	5.2	3.8	1.8	2.8	4.2	3.9	
L.Q.	1.8		2.1	2.4	2.3	2.8	2.2	3.0	3.2	3.2	4.2	4.9	5.7	6.3	6.8	6.3	5.6	5.2	3.8	2.2	1.7	1.6	2.1	2.6	
Q.R.	2.0		0.6	1.3	1.3	1.0	2.4	0.9	1.2	0.9	0.6	0.7	1.3	1.1	1.2	1.5	2.0	1.9	1.4	1.6	0.1	1.2	2.1	1.3	

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 20.0 Mc in 20.0 <sup>min</sup> sec in automatic operation.

Observed by N. Ōse

foF2



PROVISIONAL IONOSPHERIC DATA

Lat. 69° 00.4' S  
Long. 39° 35.4' E

Showa Base

45° E Mean Time (G.M.T.+3h.)

foF2

Aug. 1960

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	B	B	B	B	B	B	B	B	B	B	5.4F	6.4F	7.8R	B	B	7.5F	B	6.3F	3.6F	B	B	B	B
2	B	B	B	B	B	B	B	B	B	B	B	4.3F	B	7.0F	B	7.6	B	8.1F	6.2F	B	B	B	B	B
3	B	B	B	B	B	B	B	3.2R	3.2F	3.3F	4.4F	5.4F	6.0F	6.8F	B	B	6.1R	5.8	B	B	B	B	B	
4	B	B	B	B	B	B	B	B	B	B	4.7F	6.1F	B	B	B	B	B	B	3.9F	3.5F	B	B	B	2.7
5	B	B	B	B	B	B	B	2.8F	2.9F	3.9F	4.6F	7.1F	7.8F	8.0F	7.3F	6.3F	6.3F	4.1F	3.5F	3.0F	B	B	B	B
6	2.3R	B	B	B	B	B	B	3.7F	3.8F	4.1F	5.3F	6.3F	7.2F	7.9F	9.3R	R	7.0R	5.6F	4.4F	B	R	B	B	B
7	B	F	B	B	F	B	B	B	B	4.4F	4.6F	6.1F	S	7.0F	8.6F	8.3F	5.8F	5.8F	4.2F	2.2F	B	1.7R	1.8F	B
8	B	B	3.5F	3.3F	B	B	4.1F	F	4.8F	5.0F	5.3F	6.2F	7.3F	9.2F	9.1F	8.1F	7.3F	7.2F	6.2F	3.6R	B	B	B	B
9	B	B	B	B	B	B	B	B	B	B	B	B	B	6.2	5.7F	B	B	6.4F	3.2R	2.6F	B	B	B	B
10	B	B	B	B	B	B	B	B	3.3F	3.6F	4.9F	6.0R	B	6.4F	7.3F	7.3F	6.6F	5.1F	4.0F	2.9F	B	B	B	B
11	B	B	F	F	B	B	F	B	3.7F	B	5.0F	5.1F	6.4F	7.5F	8.0F	8.9	B	B	F	4.9F	B	B	B	B
12	B	B	B	F	B	B	F	B	R	4.8R	B	B	6.0F	B	B	B	8.0R	9.1R	9.9F	F	B	B	B	B
13	B	B	B	F	B	B	3.7R	3.1F	5.0F	5.0F	6.2F	7.8R	9.1F	9.4R	10.6	9.0F	8.4F	8.2S	B	B	B	B	B	B
14	B	B	B	B	B	B	B	B	4.8F	5.0F	6.1F	7.3F	7.9R	9.3F	9.3	8.6F	9.5R	8.3F	7.6F	C	C	C	B	B
15	B	B	B	B	B	B	4.7F	4.3F	4.8F	5.4F	7.1F	8.7F	9.4F	9.2F	9.6F	11.0	10.0F	8.0F	7.4F	5.0F	B	B	B	B
16	B	B	B	B	B	B	4.2F	4.5F	5.0F	5.3F	6.7F	8.5F	10.6R	10.0F	9.8	10.2	9.7	9.6F	6.3F	3.2F	3.0F	4.0F	B	B
17	B	4.0F	3.8F	B	B	B	B	B	B	B	B	B	B	B	4.0	4.2F	4.7F	4.6F	3.6F	B	F	F	B	F
18	F	B	B	B	B	B	B	B	B	B	B	5.7F	6.0F	6.1F	8.0F	8.0F	7.9F	9.0F	8.4F	F	R	B	B	B
19	B	B	B	B	B	B	3.6F	B	5.7F	7.2F	9.3R	10.2	10.1	10.6R	10.7R	10.3R	10.3R	11.0R	11.0F	7.4F	4.5F	B	B	B
20	B	F	B	F	F	3.8F	5.0F	4.9F	B	B	B	B	B	5.0F	5.1F	C	5.3F	6.0F	5.4F	4.6F	2.7F	B	B	B
21	B	B	B	B	B	B	4.6F	B	B	5.1F	B	B	B	B	R	11.0R	9.8	8.6F	8.4F	5.7F	B	B	F	B
22	B	B	B	B	B	B	3.9R	B	B	5.3F	6.1F	7.0F	7.4F	8.1F	9.5F	10.5R	10.9R	8.7F	7.1F	4.7F	R	B	B	R
23	B	B	B	B	B	B	B	B	4.1F	5.3F	6.4F	8.2F	9.0R	9.5	10.9F	10.7R	9.8F	8.5F	7.7F	5.4F	3.1F	R	1.7R	1.6R
24	1.8R	1.9R	B	B	B	B	B	B	4.4F	5.6F	6.7F	7.6F	8.2	9.7F	10.1R	10.2R	10.2R	8.8R	7.3F	5.7F	3.3F	2.4R	B	B
25	B	B	B	B	B	B	4.0R	4.4F	4.3R	5.8R	7.8F	8.9F	10.3R	9.6F	9.9R	9.3F	9.3R	7.7F	5.9F	5.0F	3.8F	2.4F	R	B
26	B	3.0F	3.1F	3.3R	B	B	4.1F	F	4.0R	5.6F	7.4F	8.9F	9.3F	10.0F	10.0R	9.1F	9.0F	6.8F	6.9F	6.2F	3.4F	2.2F	1.9F	B
27	B	B	B	B	B	B	B	B	6.3F	6.5F	6.6F	7.3F	8.7F	8.9F	9.6F	9.9F	9.5F	8.6F	8.7F	5.0F	B	B	B	B
28	B	B	B	F	F	F	F	B	B	B	B	B	7.4F	7.2F	8.6F	8.2F	9.0	8.8	8.9F	6.5R	B	B	B	B
29	B	B	B	B	B	B	0.50F	4.9R	F	B	B	5.2F	5.0F	4.7F	5.5F	5.6F	5.1F	6.3F	6.0F	4.7F	2.3F	2.5F	B	B
30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	4.7R	5.5R	4.2R	3.8R	3.8R	4.7F	B	B	B	B
31	B	B	B	B	B	B	B	B	B	B	B	6.2F	B	B	B	9.4F	9.4R	9.6R	8.4R	5.7R	R	B	B	B
No.	2	3	3	3	5	7	7	12	16	17	22	23	20	26	24	24	27	28	27	22	11	6	3	2
Median	2.0	3.0	3.5	3.3	3.2	4.1	4.4	4.0	4.4	5.3	5.7	7.0	7.6	7.8	9.2	9.0	8.4	8.0	6.3	4.8	3.2	2.4	1.8	2.2
U.Q.	3.5	3.6	3.7	3.7	4.4	4.5	5.0	4.5	4.8	5.6	6.2	8.2	9.2	9.4	9.7	10.2	9.7	8.8	8.4	5.7	3.8	2.5	1.8	
L.Q.	2.4	2.3	2.3	2.3	3.6	3.8	3.7	3.4	3.8	4.2	4.8	6.0	6.8	6.8	7.6	7.8	6.3	5.9	4.4	3.5	2.7	2.2	1.8	
Q.R.	1.1	0.3	0.4	0.4	0.8	0.7	1.3	1.1	1.0	1.4	1.4	2.2	2.4	2.6	2.1	2.4	3.4	2.9	4.0	2.2	1.1	0.3	0	

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 2.0 Mc in 20.0 sec in automatic operation.

Observed by N. Ōse

foF2

Lat. 69° 00.4' S  
Long. 39° 35.4' E

PROVISIONAL IONOSPHERIC DATA

Showa Base

45° E Mean Time (G.M.T.+3h.)

5072

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	B	B	B	B	B	3.1F	3.5F	4.7	6.0	7.6	8.0	9.3F	9.9F	8.6	9.0R	7.8F	6.9F	R	5.4F	3.3R	B	2.0R	1.8R
2	B	B	B	2.1F	2.2F	3.0F	3.0F	B	B	B	6.2R	8.7F	9.0F	9.4F	9.9	9.6F	9.3F	9.7R	7.2R	R	B	B	B	B
3	F	F	F	4.2F	F	B	B	B	B	B	B	B	B	B	4.9F	5.0R	5.2F	5.7R	5.2F	4.2R	B	B	B	B
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
6	B	B	B	B	B	B	B	5.0R	B	B	B	B	B	B	B	5.0	5.1F	5.0F	5.1F	4.3F	B	B	B	B
7	B	B	B	B	B	B	B	4.1R	5.1F	B	6.2R	7.1	8.6F	9.0F	9.6F	10.2F	10.0F	10.0F	R	4.3F	R	B	B	B
8	B	B	B	B	B	4.3F	4.2F	B	B	B	5.1F	5.7R	B	7.0F	8.0F	8.6R	8.9F	8.0F	7.9F	5.1F	B	B	B	B
9	B	B	B	F	F	B	4.1F	5.1F	B	B	6.1F	6.1F	6.3F	7.0F	7.6F	7.4F	7.6F	7.6F	8.0F	6.6F	5.3F	B	B	B
10	B	B	F	B	B	B	4.6F	5.2F	B	6.3F	6.3R	7.4R	8.3F	8.9	10.7	10.5R	10.7R	10.5F	8.7F	4.4F	B	B	B	B
11	B	2.3R	B	4.2F	5.1R	B	B	B	6.4F	6.7F	6.6F	7.6F	7.9	7.7	8.4	8.9	9.3	9.3F	8.2F	5.9F	R	B	B	B
12	F	B	4.7F	F	F	B	B	5.4F	5.6F	B	6.7F	7.0F	7.4R	7.4R	8.5R	9.0R	8.7F	8.4F	8.3R	6.4F	4.0F	R	B	B
13	B	3.2R	3.1F	B	F	B	B	B	4.6F	B	5.6F	5.8F	6.3F	7.7F	8.2F	R	9.7F	9.1F	9.3R	7.8R	5.3F	F	3.0F	B
14	B	4.1F	F	B	B	R	C	C	C	C	5.6F	6.0R	6.8F	7.2F	7.8F	8.0F	8.2F	8.8F	8.7F	7.8F	6.4F	5.1F	3.9F	R
15	B	B	4.4R	3.8R	3.6R	3.7R	3.9F	B	6.3R	6.5R	R	8.3R	9.7R	9.9R	10.4F	10.0R	9.7F	9.4F	8.4F	8.4F	6.1R	3.4F	2.1F	C
16	B	B	B	B	B	4.0R	4.6F	5.2F	6.8F	8.4F	9.6F	10.6	11.1F	11.0	11.0	11.1	10.6R	10.3F	9.3R	8.7F	7.2R	6.0F	5.0F	3.8F
17	2.7R	B	B	B	B	4.1F	4.3F	R	5.3R	6.5F	8.5F	9.6R	9.7	9.9F	10.3R	10.6R	R	9.8R	9.5F	8.1F	6.8F	4.2F	3.3R	B
18	B	B	B	B	F	B	B	F	F	B	6.2F	6.6F	6.5F	7.6F	8.1R	9.0F	9.1F	9.0F	8.8F	8.1F	5.0F	3.5F	B	B
19	B	F	F	F	B	B	4.7F	4.7F	5.3F	6.0F	6.7F	8.0F	9.0F	10.0F	10.7F	11.1R	10.8	10.2R	10.1R	8.5F	6.8F	5.6F	3.6F	2.7F
20	2.3F	2.2F	2.3F	2.6R	B	B	2.6F	4.0F	5.3F	6.7F	8.2F	9.6F	10.6	11.0	11.9	11.8R	11.9	12.0R	11.4R	10.5R	9.6R	7.6F	4.8F	2.7F
21	2.1F	B	B	B	5.8R	6.0F	7.0F	7.7F	8.9	9.7	A	10.9R	11.2	11.0	11.2F	10.7R	11.2R	11.1R	12.3F	8.3F	5.4F	B	F	B
22	F	R	F	F	F	F	4.9F	4.9F	5.6R	6.2R	7.6F	9.0F	10.2R	10.8F	11.3F	11.4F	10.9R	11.1R	10.5R	8.3F	3.9F	B	R	R
23	C	R	R	F	F	B	4.9F	4.9F	5.9F	5.7F	6.5F	6.7	7.3F	7.3F	8.0F	10.0R	9.3F	9.3F	8.1F	7.9F	6.0F	4.1F	2.9F	B
24	B	F	B	B	B	B	B	B	5.5F	B	B	B	F	F	5.2R	4.6F	7.2F	6.2F	5.3F	5.2F	F	B	F	4.0R
25	U.39F	B	B	4.3R	R	3.7F	4.3F	5.0F	5.9F	7.1F	8.6F	9.0F	10.4	10.8	10.7	10.9	10.5	10.1	9.3	8.7	6.6F	4.7F	3.1F	B
26	4.4F	B	3.5F	3.9F	F	B	F	6.1F	7.0F	7.7F	8.9F	9.3F	9.4R	9.6R	11.5R	11.0R	B	10.4R	9.6F	8.9F	7.2F	6.1F	4.6F	B
27	F	F	F	4.7F	4.3F	4.9F	F	B	B	B	B	B	B	B	9.0R	9.5R	9.4R	9.6F	8.2F	7.5F	6.3F	4.7F	B	B
28	B	B	B	B	B	F	5.0F	5.8F	6.5F	7.0F	7.7F	8.1F	8.8F	9.1F	9.0F	10.6F	8.3F	7.9F	8.1F	8.1F	5.9F	B	B	B
29	B	F	F	4.4F	4.3F	5.0F	5.5F	6.5F	7.7F	8.7F	9.0F	9.6F	9.1R	8.8F	9.2F	9.7F	9.9R	10.7R	9.1R	7.0F	F	B	B	B
30	F	B	4.7F	3.8F	B	3.8F	4.3F	5.0F	B	B	5.1F	5.3F	5.6F	6.1R	6.0F	6.1F	6.1F	S	F	3.7F	B	B	B	B
31																								
No.	5	4	7	11	8	11	17	20	15	17	22	23	22	25	27	27	26	27	25	27	19	11	11	5
Median	2.7	2.8	4.4	4.2	4.6	4.0	4.5	5.2	6.4	6.7	6.9	8.1	9.0	8.9	9.0	9.6	9.3	9.3	8.7	7.8	5.9	4.7	3.1	2.7
U.A	4.2	3.6	4.7	4.3	5.0	4.7	5.4	5.4	6.8	8.0	8.5	9.3	10.0	10.3	10.7	10.7	10.5	10.3	9.4	8.4	6.8	5.6	3.9	3.9
L.Q	2.2	2.2	3.1	3.8	3.8	3.7	4.0	4.9	5.9	6.2	6.2	6.6	7.3	7.5	8.0	8.0	8.2	8.0	8.0	5.2	4.0	4.1	2.7	2.2
Q.R	2.0	1.4	1.6	0.5	1.2	1.0	1.0	0.5	0.9	1.8	2.3	2.7	2.7	2.8	2.7	2.7	2.3	2.3	1.4	3.2	2.8	1.5	1.2	1.7

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 20.0 Mc in 200 sec in automatic operation.

Observed by M. Ose

5072

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IONOSPHERIC DATA IN JAPAN FOR NOVEMBER 1960

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