CRPL-F 155 PART B FOR OFFICIAL USE

PART B

SOLAR - GEOPHYSICAL DATA

ISSUED
JULY 1957

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

CRPL-F 155
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CONTENTS

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INTRODUCTION

This monthly report series is intended to keep research workers abreast of the major particulars of solar activity and the associated ionospheric, radio propagation and other geophysical effects. It is made possible through the cooperation of many observatories, laboratories and agencies as recorded in the detailed description of the tables and graphs which follows. The report is edited by Miss J. V. Lincoln of the Sun-Earth Relationships Section.

I DAILY SOLAR INDICES

Relative Sunspot Numbers -- The table includes (1) the daily American relative sunspot numbers, R_A', as compiled by the Solar Division of the American Association of Variable Star Observers, and (2) the provisional daily Zürich relative sunspot numbers, R_Z, as communicated by the Swiss Federal Observatory. Because of the time required to collect and reduce the observations, R_A' will normally appear one month later than R_Z.

The relative sunspot number is an index of the activity of the entire visible disk. It is determined each day without reference to preceding days. Each isolated cluster of sunspots is termed a sunspot group and it may consist of one or a large number of distinct spots whose size can range from 10 or more square degrees of the solar surface down to the limit of resolution (e.g. 1/8 square degrees). The relative sunspot number is defined as $R=K(10g+s)$, where g is the number of sunspot groups and s is the total number of distinct spots. The scale factor K (usually less than unity) depends on the observer and is intended to effect the conversion to the scale originated by Wolf. The observations for sunspot numbers are made by a rather small group of extraordinarily faithful observers, many of them amateurs, each with many years of experience. The counts are made visually with small, suitably protected telescopes.

Final values of R_Z appear in the IAU Quarterly Bulletin on Solar Activity, the Journal of Geophysical Research and elsewhere. They usually differ slightly from the provisional values. The American numbers, R_A', are not revised.

Solar Flux Values, 2800 Mc -- The table also lists the daily values of solar flux at 2800 Mc recorded in watts/M^2/cycle/second bandwidth ($\times 10^{-22}$) in two polarizations by the National Research Council at Ottawa, Canada. These solar radio noise indices are being published in accordance with CCIR Report 25 that a basic solar index for ionospheric propagation should be measured objectively and "preferably refer to a property of the sun such as radiation flux which has direct physical relationship to the ionosphere."

Graph of Sunspot Cycle -- The graph illustrates the recent trend of Cycle 19 of the 11-year sunspot cycle and some predictions of the future level of activity. The customary "12-month" smoothed index, $\bar{R}$, is used throughout, the data being final R_Z numbers except for the current year. Predictions shown are those made for one year after the latest available datum by the method of A. G. McNish and J. V. Lincoln (Trans. Am. Geophys. Union, 30, 673-685, 1949) modified by the use of regression coefficients and mean cycle values recomputed for Cycles 8 through 18. Cycle 19 began April 1954, when the minimum $\bar{R}$ of 3.4 was reached.

II SOLAR CENTERS OF ACTIVITY

Calcium Plage and Sunspot Regions -- The table gives particulars of the centers of activity visible on the solar disk during the preceding month. These are based on estimates made and reported on the day of observation and are therefore of limited reliability.

The table gives the heliographic coordinates of each center (taken as the calcium plage unless two or more significantly and individually active sunspot groups are included in an extended plage) in terms of the Greenwich date of passage of the sun's central meridian (CMP) and the latitude; the serial number of the plage as assigned by McMath-Hulbert Observatory; the serial number of the center in the previous solar rotation, if it is a persisting region; particulars of the plage at CMP: area, central intensity; a summary of the development of the plage during the current transit of the disk, where b = born on disk, ℓ = passed to or from invisible hemisphere, d = died on disk, and / = increasing, - = stable, \ = decreasing; and age in solar rotations; particulars of the associated sunspot group, if any, at CMP: area and spot count and the summary of development during the current disk transit, similar to the above. The unit of area is a millionth of the area of a solar hemisphere; the central intensity of calcium plages is roughly estimated on a scale of 1 = faint to 5 = very bright.

Calcium plage data are available through the cooperation of the McMath-Hulbert Observatory of the University of Michigan and the Mt. Wilson Observatory. The sunspot data are compiled from reports from the U. S. Naval Observatory, Mt. Wilson Observatory, and from reports from Europe and Japan received through the daily Ursigram messages.

Coronal Line Emission Indices -- In the table are summarized solar coronal emission intensity indices for the green (Fe XIV at λ5303) and red (Fe X at λ6374) coronal lines. The indices are based on measurements made at 5° intervals around the periphery of the solar disk by the High Altitude Observatory at Climax, Colorado, and by Harvard University observers at Sacramento Peak (The USAF Upper Air Research Observatory at Sunspot, New Mexico, under contract AF 19(604)-146). The measurements are expressed as the number of millionths of an Angstrom of the continum of the center of the solar disk (at the same wavelength as the line) that would contain the same energy as the observed coronal line. The indices have the following meanings:

G_6 = mean of six highest line intensities in quadrant for λ5303.

R_6 = same for λ6374.

G_1 = highest value of intensity in quadrant, for λ5303.

R_1 = same for λ6374.

The dates given in the table correspond to the approximate time of CMP of the longitude zone represented by the indices. The actual observations were made for the North East and South East quadrants 7 days before; for the South West and North West quadrants 7 days after the CMP date given.

To obtain rough measures of the integrated emission of the entire solar disk in either of the lines, assuming the coronal changes to be small in a half solar rotation, it is satisfactory to perform the following type of summation given in example for 15 October:

$$\left(\text{MEAN DISK EMISSION IN } \lambda 5303\right)_{15\text{ OCT}} = \frac{1}{N}\left[\sum_{15\text{ OCT}}^{22\text{ OCT}}\left\{(G_6)_{NE} + (G_6)_{SE}\right\} + \sum_{8\text{ OCT}}^{14\text{ OCT}}\left\{(G_6)_{SW} + (G_6)_{NW}\right\}\right]$$

where N is the number of indices entering the summation.

Such integrated disk indices as well as integrated whole-sun indices are computed for each day and are published quarterly in the "Solar Activity Summary" issued by the High Altitude Observatory at Boulder, Colorado. In the same reports are given maps of the intensity distribution of coronal emission derived from all available Climax and Sacramento Peak observations, as well as other information on solar activity, such as maps made from daily limb prominence surveys in Hα and notes regarding the history of active regions on the solar disk.

Preliminary summaries of solar activity, prepared on a fast schedule, are issued Friday of each week from High Altitude Observatory in conjunction with CRPL and include solar activity through the preceding day. These are useful to groups needing information on the current status of activity on the visible solar disk, but are not recommended for research uses unless such a prompt schedule of reporting is essential. The same information is included in the subsequent quarterly reports, with extensive additions, corrections and evaluations.

III SOLAR FLARES

Optical Observations -- The table presents the preliminary record of solar flares as reported to the CRPL on a rapid schedule at the sacrifice of detailed accuracy. Definitive and complete data are published later in the Quarterly Bulletin of Solar Activity, I.A.U., in various observatory publications and elsewhere. The present listing serves to identify and roughly describe the phenomena observed.

Reporting directly to the CRPL are the following observatories: Mt. Wilson, McMath-Hulbert, U. S. Naval, Wendelstein, Sacramento Peak, Mitaka, and Swedish Astrophysical Station on Capri. The remainder report through the URSIgram centers in Europe. Observations are in the light of the center of the H-alpha line unless noted otherwise. The reports from Sacramento Peak, New Mexico (communicated to CRPL by the High Altitude Observatory at Boulder) are from observations at the USAF Upper Air Research Observatory at Sunspot, New Mexico, by Harvard University observers, under contract AF 19(604)-146.

For each flare are listed the reporting observatory, date, times of beginning and ending of observing period (b or a preceding the number denotes true start or end of flare unknown), duration of flare (when known), total area in millionths of visible disk (Sacramento Peak uncorrected for foreshortening; Swedish Astrophysical Station corrected for foreshortening), the McMath serial number of the region with which the flare is associated, the heliographic coordinates in degrees, the time of maximum phase, maximum intensity of flare, fractional area having nearly maximum brightness, and finally the flare importance on the IAU scale of 1- to 3+. A final column lists provisionally the occurrence of simultaneous ionospheric effects as observed on selected field strength recordings of distant high-frequency radio transmissions; a more nearly definitive list of these ionospheric effects, including particulars, appears in these reports after the lapse of a month (see below). All times are Universal Time (UT or GCT). Subflares (importance 1-) are listed by date, time of beginning and their heliographic coordinates.

Ionospheric Effects -- SID (and GID--gradual ionospheric disturbances) may be detected in a number of ways: short wave fadeouts, enhancement of low frequency atmospherics, increases in cosmic absorption, and so forth. The table lists events that have been recognized on field strength recordings of distant high-frequency radio transmissions. Under a coordinated program, the staffs at the following ionospheric sounding stations contribute reports that are screened and synthesized at CRPL-Boulder: Puerto Rico, Ft. Belvoir, Va., and Anchorage, Alaska (CRPL Stations: PR, BE, AN); Huancayo, Peru, and College, Alaska (CRPL-Associated Laboratories: HU, CO); and White Sands, N. Mex., Adak, Alaska, and Okinawa (U. S. Signal Corps Stations: WS, AD, OK). McMath-Hulbert Observatory (MC) also contributes such reports. In addition, reports are volunteered by RCA Communications Inc., Marconi Wireless, Netherlands Postal and Telecommunications Services, Swedish Telecommunications, and others; these usually specify times of SID and the radio paths involved.

In the coordinated program, the abnormal fades of field strength not obviously ascribable to other causes, are described as short wave fadeouts with the following further classification:

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

When there is agreement among the various reporting stations on the time (UT) of an event, it is accepted as a widespread phenomenon and listed in the table.

The degree of confidence in identifying the event, a subjective estimate, is reported by the stations and this is summarized in an index of certainty that the event is widespread, ranging from 1 (possible) to 5 (definite). The times given in the table for the event are from the report of a station (underlined in table) that identified it with high confidence. The criteria for the subjective importance rating assigned by each station on a scale of 1- to 3+ include amplitude of the fade, duration and confidence; greater consideration is given to reports on paths near the subsolar point in arriving at the summary importance rating given in the table.
Note: The tables of SID observed at Washington included in CRPL F-reports prior to F-135 were restricted to events classed here as S-SWF.

IV SOLAR RADIO WAVES

2800 Mc Observations

The data on solar radio wave events made in Ottawa, Canada by the Radio and Electrical Engineering Division of the National Research Council at 2800 Mc (10-cm emission) are presented. Near local noon (about 1700 UT) the sensitivity of the radiometer is determined and a mean flux for the whole day calculated. These values are given in a tabular form (see table I-1) in units of 10^{-22} watts/M^2/c/s. Burst phenomena are measured above this level and are given in terms especially suitable for the variations observed on this frequency. These classifications are described by Dodson, Hedeman and Covington, Ap. J. 119, 541, 1954:

1 - Single -- Any one burst without reference to structure, but usually applied to bursts of short duration and with intensity only a few times receiver noise.

2 - Single-simple -- A single burst with only one maximum.

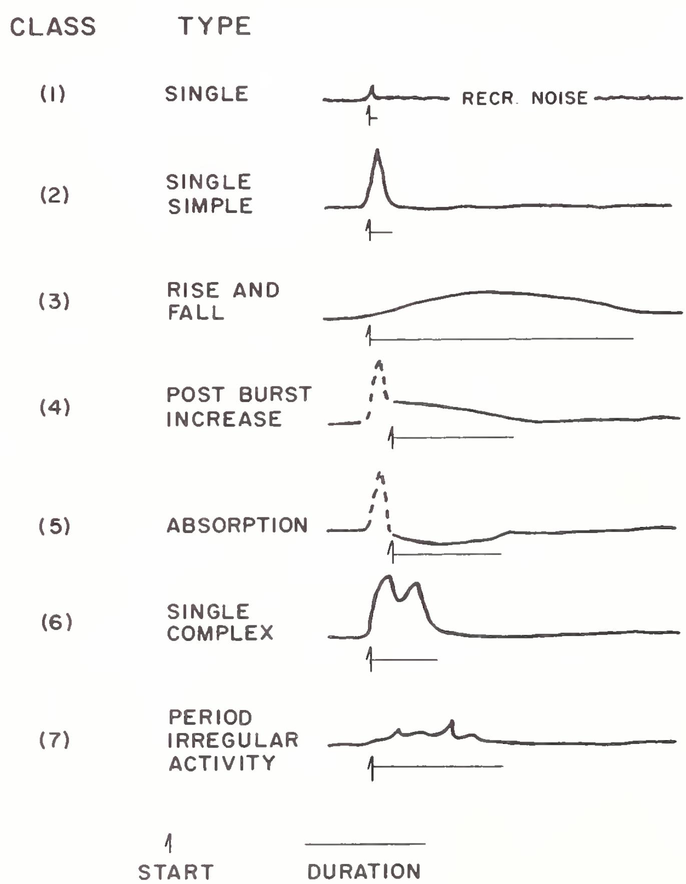
3 - Rise and fall -- A distinct, but less sudden, increase in flux than the usual burst. It may last from tens of minutes to several hours. These events range from large distinct features on the records to tiny bursts, only a few times receiver noise.

4 - Post-burst increase -- Postburst level is greater than the preburst level. The gradual return to normal flux may require as long as several hours.

5 - Absorption following burst (negative post).

6 - Single complex -- A single burst which shows two or more comparable maxima before the activity has declined to zero.

7 - Period of irregular activity.



200 Mc Observations

Data on solar radio waves made at Cornell University, Ithaca, N.Y. on 201.5 Mc are presented. All times are in Universal Time (UT or GCT). The half width of the antenna lobe is appreciably greater than the solar disk. The flux reported is that contained in one linear component.

3-hourly Flux -- The mean of the three hourly flux measurements is given in terms of KTB where the quiet sun level equals 1.40 KTB.

The variability index is as described for 167 Mc and 460 Mc observations.

Outstanding Events -- A separate table lists the outstanding occurrences classified according to the same system as used for 167 Mc and 460 Mc observations.

167 Mc and 460 Mc Observations

Data on solar radio waves are from observations at 167 Mc and 460 Mc made at the Gunbarrel Hill (Boulder) station of the National Bureau of Standards. The half-width of the antenna lobe is appreciably greater than the solar disk. Polarization has not been determined. All times are in Universal Time (UT or GCT); when the observing period extends slightly into the next Greenwich day, the time scale is extended beyond 24 hours.

3-hourly and Daily Flux -- Flux is given in power units. These units are approximately 10^{-22} watt meter^{-2}(c/s)$^{-1}$ for both polarizations together. They will be subject to a correction factor when gain measurements of the antenna have been made. The median flux is measured for every one-hour period that contains a usable calibration and at least thirty minutes of usable record. A three-hour value of flux is obtained by averaging the available one-hour medians (at least two required). A daily value of flux is obtained by averaging all available one-hour medians (at least 4 required). A dash indicates that insufficient measurements were made to meet the above requirements or that the records were not of usable quality. Parentheses indicate that the value is somewhat doubtful because of atmospheric noise or local interference.

The variability index, given for each three-hour interval, is on a scale 0 to 3 defined as follows:

0 - The instantaneous flux did not drop below one-half the median level or exceed twice the median level at any time.

1 - The instantaneous flux made from one to ten excursions outside the range described above.

2 - The instantaneous flux made from ten to one hundred excursions outside the range described above.

3 - The instantaneous flux made more than one hundred excursions outside the range described above.

For the purpose of the variability index, an excursion whose maximum intensity is M times the median level is counted as M excursions. A dash is used to indicate that measurements were made for less than one hour during the period. Parentheses surround variability indices which are in doubt because of atmospheric noise or local interference.

Outstanding Events -- A separate table lists the occurrences that are not adequately described by the three-hourly values of median flux and variability. These are classified in general accordance with the system described and illustrated by Dodson, Hedeman, and Owren (Ap. J. 118, 169, 1953). The categories of events are identified in the table by numbers, which do not necessarily indicate the magnitude of the event:

0 - Rise in base level -- A temporary increase in the continuum with duration of the order of tens of minutes to an hour.

1 - Series of bursts -- Bursts or groups of bursts, occurring intermittently over an interval of time of the order of minutes or hours. Such series of bursts are assigned as distinctive events only when they occur on a smooth record or show as a distinct change in the activity.

2 - Groups of bursts -- A cluster of bursts occurring in an interval of time of the order of minutes.

3 - Minor burst -- A burst of moderate or small amplitude, and duration of the order of one or two minutes.

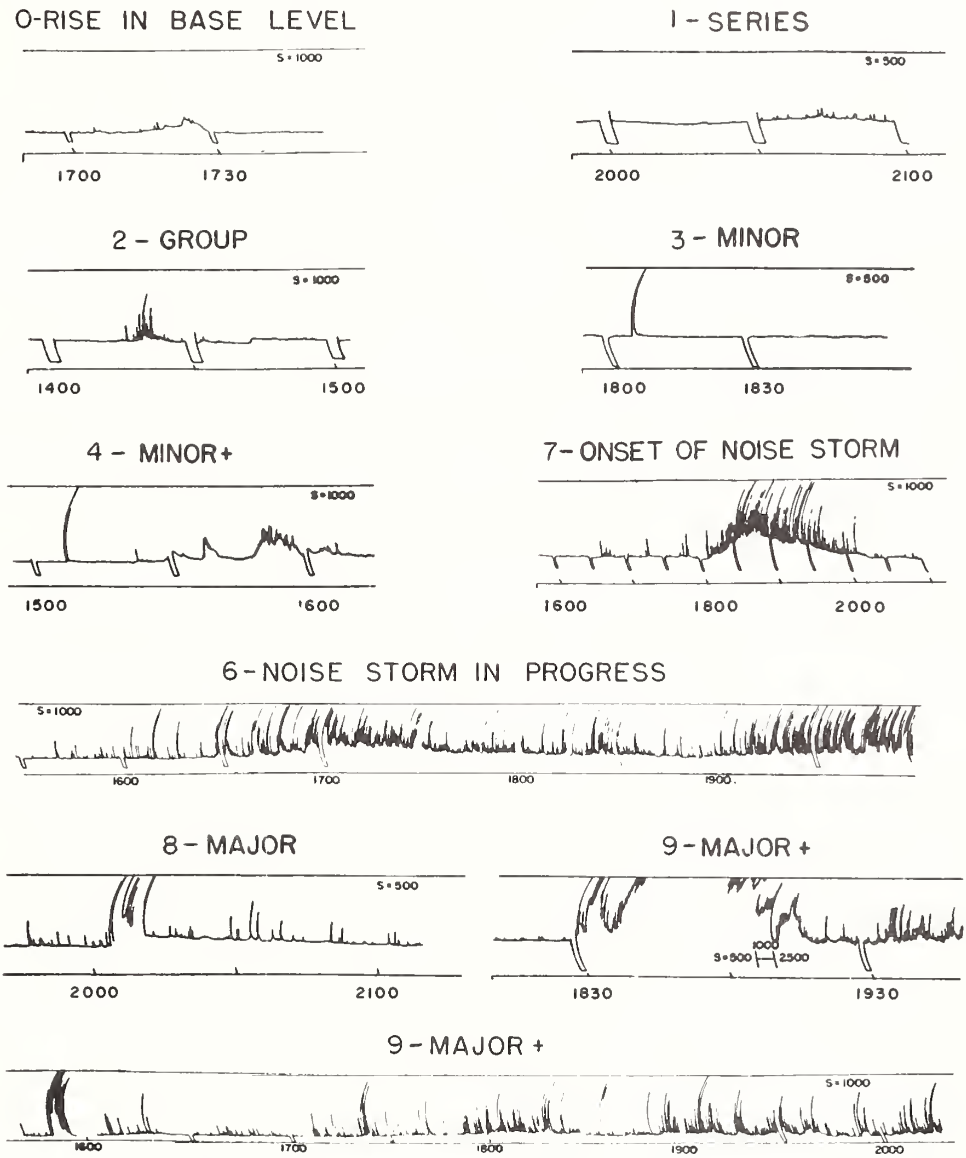
4 - Minor burst and second part -- A double rise in flux in which the early rise is a minor burst.

6 - Noise storm -- A temporary increase in radiation characterized by numerous closely spaced bursts, by an increase in the continuum, or by both. Duration is of the order of hours or days.

7 - Noise storm begins -- The onset of a noise storm occurs at some time during the observing period.

8 - Major burst -- An outburst, or other burst of large amplitude and more than average duration. A major burst is usually complex, with a duration of the order of one to ten minutes.

9 - <u>Major burst and second part</u> -- A double rise in flux, the first part of which is a major burst. The second part may consist of a rise in base level, a group or series of bursts, or the onset of a noise storm.



Starting times and durations are enclosed in parentheses when they are limited by the period of observation. The maximum instantaneous flux (Inst. Flux) is measured from the sky level as are the hourly medians. The maximum smoothed flux (Smd. Flux) is that obtained by taking the difference of the maximum value of a smooth curve drawn through the outstanding occurrence with a smoothing period of 20 percent to 50 percent of the total duration, and the value of the interpolated hourly median at that same time had the event not occurred, both measured from the sky level.

V GEOMAGNETIC ACTIVITY INDICES

C, Kp, Ap, and Selected Quiet and Disturbed Days -- The data in the table are: (1) preliminary international character figures, C; (2) geomagnetic planetary three-hour range indices, Kp; (3) daily "equivalent amplitude," Ap; (4) magnetically selected quiet and disturbed days.

This table is made available by the Committee on Characterization of Magnetic Disturbance of IAGA, IUGG. The Meteorological Office, De Bilt, Holland collects the data from magnetic observatories distributed throughout the world, and compiles C and selected days. The Chairman of the Committee computes the planetary and equivalent amplitude indices. The same data are also published quarterly in the Journal of Geophysical Research along with data on sudden commencements (sc) and solar flare effects (sfe).

The C-figure is the arithmetic mean of the subjective classification by all observatories of each day's magnetic activity on a scale of 0 (quiet) to 2 (storm).

Kp is the mean standardized K-index from 12 observatories between geomagnetic latitudes 47 and 63 degrees. The scale is 0 (very quiet) to 9 (extremely disturbed), expressed in thirds of a unit, e.g. 5- is 4 2/3, 5o is 5 0/3, and 5+ is 5 1/3. This planetary index is designed to measure solar particle-radiation by its magnetic effects, specifically to meet the needs of research workers in the ionospheric field. A complete description of Kp has appeared in Bulletin 12b, "Geomagnetic Indices C and K, 1948" of the Association of Terrestrial Magnetism and Electricity (IATME), International Union of Geodesy and Geophysics.

Ap is a daily index of magnetic activity on a linear scale rather than on the quasi-logarithmic scale of the K-indices. It is the average of the eight values of an intermediate 3-hourly index "ap," defined as one-half the average gamma range of the most disturbed of the three force components, in the three-hour interval at standard stations; in practice, ap is computed from the Kp for the 3-hour interval. The extreme range of the scale of Ap is 0 to 400. The method is described in IATME Bulletin No. 12h (for 1953) p. viii f. Values of Ap (like Kp and Cp) have been published for the Polar Year 1932/33 and for the years 1937 onwards.

The magnetically quiet and disturbed days are selected in accordance with the general outline in Terr. Mag. (predecessor to J. Geophys. Res.) 48, pp 219-227, December 1943. The method in current use calls for ranking the days of a month by their geomagnetic activity as determined from the following three criteria with equal weight: (1) the sum of the eight Kp's; (2) the sum of the squares of the eight Kp's; and (3) the greatest Kp.

Chart of Kp by Solar Rotations -- The graph of Kp by solar rotations is furnished through the courtesy of Dr. J. Bartels, Geophysikalisches Institute, Göttingen.

VI RADIO PROPAGATION QUALITY INDICES

One can take as the definition of a radio propagation quality index: the measure of the efficiency of a medium-powered radio circuit operated under ideal conditions in all respects, except for the variable effect of the ionosphere on the propagation of the transmitted signal. The indices given here are derived from monitoring and circuit performance reports, and are the nearest practical approximation to the ideal index of propagation quality.

Quality indices are usually expressed on a scale that ranges from one to nine. Indices of four or less are generally taken to represent significant disturbance. (Note that for geomagnetic K-indices, disturbance is represented by higher numbers.) The adjectival equivalents of the integral quality indices are as follows:

1 = useless	4 = poor-to-fair	7 = good
2 = very poor	5 = fair	8 = very good
3 = poor	6 = fair-to-good	9 = excellent

CRPL forecasts are expressed on the same scale. The tables summarizing the outcome of forecasts include categories P-Perfect; S-Satisfactory; U-Unsatisfactory; F-Failure. The following conventions apply:

P - forecast quality equal to observed

U - forecast quality two or more grades different from observed when both forecast and observed were > 5, or both < 5

S - forecast quality one grade different from observed

F - other times when forecast quality two or more grades different from observed

Full discussion of the reliability of forecasts requires consideration of many factors besides the over-simplified summary given.

The quality figures represent a consensus of experience with radio propagation conditions. Since they are based entirely on monitoring or traffic reports, the reasons for low quality are not necessarily known and may not be limited to ionospheric storminess. For instance, low quality may result from improper frequency usage for the path and time of day. Although, wherever it is reported, frequency usage is included in the rating of reports, it must often be an assumption that the reports refer to optimum working frequencies. It is more difficult to eliminate from the indices conditions of low quality for reasons such as multipath or interference. These considerations should be taken into account in interpreting research correlations between the Q-figures and solar, auroral, geomagnetic or similar indices.

North Atlantic Radio Path -- The CRPL quality figures, Qa, are compiled by the North Atlantic Radio Warning Service (NARWS), the CRPL forecasting center at Ft. Belvoir, Virginia, from radio traffic data for North Atlantic transmission paths closely approximating New York-to-London. These are reported to CRPL by the Canadian Defense Research Board, Canadian Broadcasting Corporation, and the following agencies of the U. S. Government:--Coast Guard, Navy, Army Signal Corps, U. S. Information Agency. Supplementing these data are CRPL monitoring, direction-finding observations and field strength measurements of North Atlantic transmissions made at Belvoir.

The original reports are submitted on various scales and for various time intervals. The observations for each 6-hour interval are averaged on the original scale. These 6-hour indices are then adjusted to the 1 to 9 quality-figure scale by a conversion table prepared by comparing the distribution of these indices for at least four months, usually a year, with a master distribution determined from analysis of the reports originally made on the 1 to 9 quality-figure scale. A report whose distribution is the same as the master is thereby converted linearly to the Q-figure scale. The 6-hourly quality figure is the mean of the reports available for that period.

The 6-hourly quality figures are given in this table to the nearest one-third of a unit,e.g. 5o is 5 and 0/3; 5- is 4 and 2/3; 5+ is 5 and 1/3. Other data included are:

(a) Whole-day radio quality indices, which are weighted averages of the four 6-hourly indices, with half weight given to quality grades 5 and 6. This procedure tends to give whole-day indices suitable for comparison with whole-day advance forecasts which seek to designate the days of significant disturbance or unusually quiet conditions.

(b) Short-term forecasts, issued every six hours by the North Atlantic Radio Warning Service. These are issued one hour before 00^h, 06^h, 12^h, 18^h, UT and are applicable to the period 1 to 7 hours ahead.

(c) Advance forecasts, issued twice weekly by the NARWS (CRPL-J reports) and applicable 1 to 3 or 4 days ahead, 4 or 5 to 7 days ahead, and 8 to 25 days ahead. These forecasts are scored against the whole-day quality indices.

(d) Half-day averages of the geomagnetic K indices measured by the Fredericksburg Magnetic Observatory of the U. S. Coast and Geodetic Survey.

A chart compares the short-term forecasts with Qa-figures. A second chart compares the outcome of advance forecasts (1 to 3 or 4 days ahead) with a type of "blind" forecast. For the latter, the frequency for each quality grade, as determined from the distribution of quality grades in the four most recent months of the current season, is partitioned among the grades observed in the current month in proportion to the frequencies observed in the current month.

Ranges of useful frequencies on the North Atlantic radio path are shown in a series of diagrams, one for each day. The shaded area indicates the range of frequencies for which transmissions of quality 5 or greater were observed. The blacker the diagram, the quieter the day has been; a narrow strip indicates either high LUHF, low MUF, or both. These diagrams are based on data reported to CRPL by the German Post Office through the Fernmeldetechnischen Zentralamtes, Darmstadt, Germany, being observations every one and a half hours of selected transmitters located in the eastern portion of North America. The magnetic activity index, A_{Fr}, from Fredericksburg, Va., is also given for each day.

Note: Beginning with data for September 1955, Qa has been determined from reports that are available within a few hours or at most within a few days, including for the first time, the CRPL observations. Therefore these are the indices by which the forecasters assess every day the conditions in the recent past. Over a period of several years, they have closely paralleled the former Qa indices which excluded CRPL observations and included three additional reports received after a considerable lag. Qa was first published to the nearest one-third of a unit at the same time.

North Pacific Radio Path -- The CRPL quality figures, Qp, are compiled by the North Pacific Radio Warning Service (NPRWS), the CRPL forecasting center at Anchorage, Alaska, from radio traffic data for moderately long transmission paths in the North Pacific equivalent to Seattle-to-Anchorage or Anchorage-to-Tokyo. These include reports to CRPL by the Alaska Communications System, Aeronautical Radio, Inc., U. S. Air Force and Civil Aeronautical Administration. In addition, there are CRPL monitoring, direction finder observations and field strength measurements of suitable transmissions.

The original reports are on various scales and for various time intervals. The observations for each 8 hours or 24 hour period are averaged on the original scale. This average is compared with reports for the same period in the preceding two months and expressed as a deviation from the 3-month mean. The deviations are put on the 1 to 9 scale of quality which is assumed to have a standard deviation of 1.25 and a mean for the various periods as follows:

03-10 hours UT	5.33
11-18	5.33
19-02	6.00
00-24	5.67

The 8-hour and 24-hour indices Qp are determined separately. Each index is a weighted mean where the CRPL observations have unit weight and the others are weighted by the correlation coefficient with the CRPL observations.

The table, analagous to that for Qa, includes the 8-hourly quality figures; whole day quality figures; short term forecasts issued by NPRWS three times daily at 02^h, 10^h, and 18^h UT, applicable to the stated 8-hour periods; advance forecasts issued twice weekly by NPRWS (CRPL-Jp report); and half-day averages of geomagnetic K indices from Sitka.

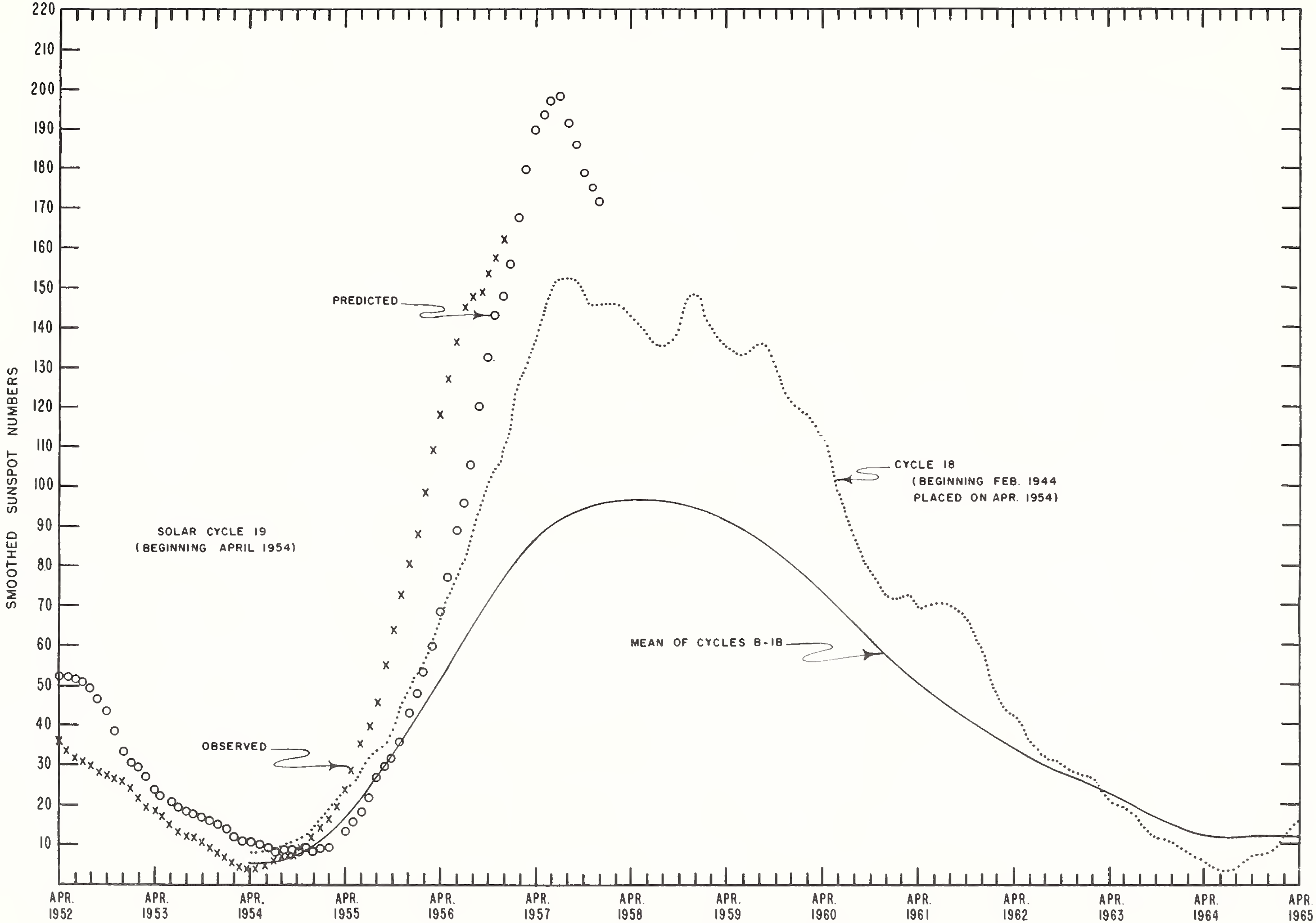
The chart compares the outcome of advance forecasts, on the same basis as the similar chart for the North Atlantic Radio Path.

Note: Beginning with November 1956 the short-term forecast formerly made at 0900 UT was changed to 1000 UT. The North Pacific quality figures used for evaluation are now 8-hourly rather than 9-hourly.

DAILY SOLAR INDICES

May 1957 Date	American Relative Sunspot Numbers R_A'
1	124
2	125
3	119
4	85
5	106
6	106
7	117
8	134
9	156
10	151
11	156
12	190
13	161
14	205
15	179
16	197
17	159
18	182
19	172
20	187
21	173
22	172
23	174
24	185
25	126
26	116
27	137
28	146
29	163
30	159
31	134
Mean:	151.5

June 1957 Date	Zurich Provisional Relative Sunspot Numbers R_Z	Daily Values Solar Flux at 2800 MC, Ottawa, Canada Flux
1	158	218
2	163	229
3	180	230
4	169	218
5	159	222
6	194	226
7	170	221
8	145	223
9	168	233
10	158	220
11	140	224
12	160	226
13	179	245
14	159	247
15	239	255
16	248	264
17	252	268
18	274	288
19	280	292
20	285	295
21	275	295
22	260	293
23	250	297
24	235	277
25	210	253
26	230	260
27	238	259
28	190	261
29	186	260
30	213	265
Mean:	205.6	252.1



PREDICTED AND OBSERVED SUNSPOT NUMBERS

CALCIUM PLAGE AND SUNSPOT REGIONS

JUNE 1957

CMP June 1957	Lat.	McMath Plage Number	Return of Region	Calcium Plage Data CMP Values Area	Int.	History	Age	Sunspot Data CMP Values Area	Count	History
00.4	S03	4005	**	(300)	(1.5)	b − ℓ	1			
02.2	S22	3996	*	4,500	3	ℓ \ ℓ	1	1310	19	ℓ ∧ ℓ
03.4	N09	4001	New	100	2.5	b / ℓ	1	(550)	(10)	b / ℓ
04.7	S17	3997	(a)	5,200	3	ℓ ∨ ℓ	9	700	4	ℓ ∧ ℓ
04.8	N31	4006	**	200	1.5	b − ℓ	1			
06.7	S21	3998	3972	1,300	2	ℓ − ℓ	3	420	2	ℓ / ℓ
07.5	N13	3999	3974	6,500	3	ℓ ¬ ℓ	3	340	2	ℓ ℓ
08.4	S33	4003	New	3,000	3	ℓ _ ℓ	1	(10)	(1)	b − ℓ
08.7	S17	4002	3902	7,000	3	ℓ \ ℓ	2	900	8	ℓ _ ℓ
11.0	N36	4007	**	(400)	(1)	ℓ − d	1			
11.9	N22	4008	3976	700	2	ℓ − ℓ	3	(50)	(5)	b − d
12.4	S22	4019	New	1,200	1.5	b _ ℓ	1			
13.0	S12	4009	3979	2,500	3	ℓ \ ℓ	3	(50)	(3)	b − d
13.1	N13	4010	3976	1,400	3	ℓ − ℓ	3	160	10	b \ ℓ
14.6	N30	4011	New	9,000	3.5	ℓ _ ℓ	1	970	27	ℓ ¬ ℓ
15.1	S31	4013	New	1,100	1.5	ℓ ¬ d	1			
15.6	N48	4025	**	300	2	b − d	1			
15.8	S17	4012	3980	5,000	2.5	ℓ \ ℓ	4	(40)	(1)	b − d
16.4	N24	4014	3981	1,200	1.5	ℓ _ ℓ	4			
16.5	N13	4015	3983	1,400	1.5	ℓ _ ℓ	2			
17.2	N46	4033	New	(1,700)	(2.5)	b − ℓ	1	(30)	(3)	b / ℓ
18.1	N12	4017	New	600	2.5	ℓ ∨ ℓ	1	(80)	(5)	ℓ \ d
18.3	N32	4016	3985	500	1	ℓ _ d	5			
18.5	S18	4018	3984	3,500	2.5	ℓ \ ℓ	2	300	20	ℓ ∧ ℓ
19.5	N29	4020	3985	600	1	ℓ \ d	5			
19.6	S15	4022	3988	3,800	3	ℓ − ℓ	3	510	9	ℓ ∧ ℓ
19.8	N21	4037	**	(500)	(2.5)	b − ℓ	1	20	2	b − ℓ
20.6	N15	4027	3987	400	1.5	b − ℓ	2			
21.2	S35	4021	+	5,000	3	ℓ _/ ℓ	2	2060	28	ℓ ∧ ℓ
21.3	S17	4026	3988	1,000	1.5	ℓ − ℓ	3	30	1	ℓ − d
22.0	N24	4023	New	3,700	3	ℓ − ℓ	1	60	1	ℓ \ d
22.4	N19	4024	++	8,000	3.5	ℓ \ ℓ	1,2	2460	21	ℓ ∧ ℓ
22.8	S20	4031	3988	800	1.5	ℓ \ ℓ	3			
23.2	S34	4032	New	500	1	b \ ℓ	1			
24.2	N32	4028	New	2,000	3	ℓ − ℓ	1	130	3	ℓ \ d
25.0	N24	4029	+++	1,800	2.5	ℓ \ ℓ	2	120	3	ℓ \ ℓ
25.3	S21	4030	3993	8,000	3.5	ℓ − ℓ	2	2530	20	ℓ ∧ ℓ
26.9	S12	4036	3994	600	1	ℓ \ d	2			
27.3	N26	4034	3992	1,000	1.5	ℓ − ℓ	4			
27.3	S24	4035	3995	1,800	2	ℓ − ℓ	3	50	2	b ∧ d
27.8	N36	4040	3992	100	1	ℓ \ d	4			
29.4	S20	4038	3996	2,000	2	ℓ − ℓ	2			
30.3	N12	4039	4001	4,000	4	ℓ − ℓ	2	560	16	ℓ − ℓ

* New, in position of old 3964.
** New, small and ephemeral.
\+ Probably return of 3986.
++ Mostly new, in position of old 3989 and part of 3991.
+++ Part of 3991.
(a) 3967 and 3971.
( ) Values extrapolated several days to CMP.

CORONAL LINE EMISSION INDICES

JUNE 1957

CMP June 1957	North East Quadrant (observed 7 days earlier)				South East Quadrant (observed 7 days earlier)				South West Quadrant (observed 7 days later)				North West Quadrant (observed 7 days later)			
	G_6	G_1	R_6	R_1	G_6	G_1	R_6	R_1	G_6	G_1	R_6	R_1	G_6	G_1	R_6	R_1
1	54	88	16	18	82	112	23	40	125*	176	x	x	50	56	x	x
2	72	140	24	39	187	286	23	51	141	196	40	50	55	80	19	34
3	52a	68a	x	x	198a*	350a	x	x	171	228	34	60	82	122	18	28
4	47	94	27	60	166	274	40	81	66a	80a	24a	42a	32a	40a	16a	20a
5	x	x	x	x	x	x	x	x	154	189	21	38	95	108	13	16
6	x	x	x	x	x	x	x	x	120*	134	23	45	104	136	17	32
7	x	x	x	x	x	x	x	x	161	202	18	24	67*	100	13	16
8	74	116	33	46	119*	142	44	81	142	165	30	55	98	136	20	27
9	91	128	16	24	144*	196	39	58	135a	168a	18a	25a	67a	84a	18a	25a
10	129	156	7	10	240	276	27	57	75	83	15	22	58	67	18	20
11	91	140	x	x	111	124	x	x	73	120	9	16	112*	204	25	46
12	74	106	30	45	133	184	42	114	141	246	27	60	146	223	27	41
13	x	x	x	x	x	x	x	x	98a	130a	25a	70a	116a	160a	31a	40a
14	153a	219a	38a	54a	169a	216a	55a	96a	75	90	28	45	70	83	36	50
15	131	164	40	66	139*	214	71	132	103	140	33	71	96	119	24	28
16	110	124	38	56	94	140	61	126	162	218	45	90	168	212	20	27
17	83	96	27	36	112	156	48	92	196	302	38	75	128	160	27	38
18	74a	120a	17a	24a	92a	160a	24a	46a	135	230	23	41	103	150	15	21
19	108	168	28	52	144	190	22	38	x	x	x	x	x	x	x	x
20	100	130	24	55	138	204	18	32	x	x	x	x	x	x	x	x
21	108	187	31	44	144	186	19	35	104	139	23a	60a	108	158	25a	33a
22	136*	160	28	36	147	180	24	36	x	x	x	x	x	x	x	x
23	79a	88a	16a	20a	91a	140a	14a	20a	94	108	23	33	133	173	33	46
24	112	126	23	25	94	104	21	50	99a	150a	15a	28a	151a	175a	27a	45a
25	85	108	17	22	93	122	19	35	136*	264	29	51	104	164	32	82
26	98	124	19	25	140	198	21	46	x	x	x	x	x	x	x	x
27	62a	90a	21a	35a	118a	190a	27a	45a	112	162	24	44	70	105	27	62
28	41	70	19	20	76	103	25	56	105	147	26	48	84	122	24	57
29	47a	72a	25a	36a	105a	140a	31a	48a	x	x	x	x	x	x	x	x
30	81	165	21	25	177	330	32	76	x	x	x	x	x	x	x	x

* = yellow line observed.
a = index computed from low weight data.
x = no observations.

SOLAR FLARES

JUNE 1957

Observatory	Date June 1957	Time Observed Start UT	Time Observed End UT	Duration Min.	Total Area Mill.	McMath Plage Region Number	Approx. Position Lat.	Approx. Position Mer. Dist.	Time Max. Phase UT	Max. Int. Arb.	Rel. Area of Max. Tenths	Importance	Provis. Ionospheric Effect
Mitaka	01	0243	a0300	>17		3995	S26	W26	~0245			1+	S-SWF
S.Peak	01	b1436	a1520	>44	110	3996	S21	E10	~1436	20	6	1	
S.Peak	01	2329	a2356	>27	140	3993	S25	W44	2344	32	2	2-	S-SWF
S.Peak	02	1512	1605	53	227	3996	S16	W04	1520	22	5	2-	
Capri-S	02	1513	1551	38	136	3996	S17	W04				1+	Slow S-SWF
Schaus	02	b1515	1546	>31		3996	S15	W01				2	
Mitaka	03	b0103	0110	>07		3996	S16	W11				1	
Mitaka	03	b0318	a0321	>03		3999	N14	E66				1	
Wendel	03	b1047	1109	>22		3996	S15	W18	~1047			3	S-SWF
Ottawa	03	1318	1405	47		4002	S23	E74				1+	G-SWF
Capri-S	03	b1337	a1356	>19	632	4002	S22	E66				2+	
McMath	03	b1340				4002	S20	E65				2	Slow S-SWF
S.Peak	03	b1358	1412	>14	210	4002	S23	E71	1400	14	4	1+	
Mitaka	04	b0027	0155	>88		3996	S17	W23	~0057			2	S-SWF
Mitaka	04	b0348	0418	>30		3996	S15	W20	~0350			1+	Slow S-SWF
Mitaka	04	b0550	0557	>07		3997	S19	E06				1	
Mitaka	04	0621	a0628	>07		3997	S17	E06				1	
Mitaka	04	b0704	0709	>05		4002	S18	E62				1	
S.Peak	04	1525	1545	20	162	3996	S23	W37	1530	15	4	1	
Mitaka	05	0205	0225	20		3996	S17	W31	~0215			1	
Capri-S	05	b0625	a0754	>89	121	3997	S18	W13				1	
Simeiz	05	0659				4002	S17	E60				1	
Simeiz	05	b0746				3996	S18	W27	0746			2	
Capri-S	05	b0858	a0920	>22	107	3997	S18	W14				1	
Capri-S	05	b0912	a0947	>35	136	3996	S13	W43				1	S-SWF
Meudon	05	0914				3996	S15	W45				1	
Ondrejov	05	1122				3996	S21	E41				1+	
Capri-S	05	1123	a1134	>11	131	3996	S17	E39				1	Slow S-SWF
Ottawa	05	1127				3996	S18	E42	1133			1	
Ottawa	05	1248				4002	S19	E32				1	
Capri-S	05	1327	1356	29	187	3996	S13	W42				1+	
S.Peak	05	1327	1400	33	235	3996	S18	W44	1330	25	6	2-	
McMath	05	b1330	1408	>38		3996	S17	W42				2	S-SWF
Ondrejov	05	1330	1450	120		3996	S20	W45				1	
Ottawa	05	1331	1405	34		3996	S18	W43				2	
Capri-S	05	1348	a1407	>19	233	3999	N13	E22				1+	
S.Peak	05	1350	1415	25	130	3999	N07	E20	1352	20	5	1	
Ottawa	05	1354	1435	41		3999	N08	E18	1358			1+	Slow S-SWF
Ondrejov	05	1355	1360	05		3999	N06	E21				1	
McMath	05	b1356	1420	>24		3999	N08	E18				2	
Honolulu	05	2142	2202	20		3997	S19	W21	2148			1	
Honolulu	05	2216	2244	28			N16	E52	2220			2	
Ondrejov	06	b0612	0616	>04		3997	S18	W27				1	
Ondrejov	06	b0744	0752	>08		3997	S15	W25				1	S-SWF
Crimea	06	1042				3997	S28	W15				2	
Ondrejov	06	b1053	1058	>05		4001	N08	W40	1056			1	
Capri-S	06	b1130	1148	>18	146	3997	S13	W26				1	
Ondrejov	06	b1133				3997	S14	W27				1+	
Ondrejov	06	b1219	1223	>04		4001	N07	W44				1	
S.Peak	06	1255	1340	45	108	3997	S20	W30	1312	17	4	1	
Ondrejov	06	b1311	1320	>09		3997	S22	W27				1	
Ottawa	06	b1340				3996	S20	W59				1	
Capri-S	06	b1341	a1434	>53	156	3996	S14	W50				1	
Ondrejov	06	b1349				3996	S20	W55				1+	
Ondrejov	06	b1410	1417	>07		3996	S20	W55				1	

SOLAR FLARES

JUNE 1957

Observatory	Date June 1957	Time Observed Start UT	Time Observed End UT	Duration Min.	Total Area Mill.	McMath Plage Region Number	Approx. Position Lat.	Approx. Position Mer. Dist.	Time Max. Phase UT	Max. Int. Arb.	Rel. Area of Max. Tenths	Importance	Provis. Ionospheric Effect
Ottawa	06	b1423				3996	S17	W59				1	
Ottawa	06	1523				3999	N12	E12				1	
Ottawa	06	1525				3997	S23	W25				1	
Ondrejov	06	b1528	1531	>03		3997	S25	W25				1	
Ondrejov	06	b1634	1643	>09		4001	N08	W44				1	Slow S-SWF
McMath	06	b1700				3996	S20	W55				1	S-SWF
Ondrejov	06	1701				3996	S20	W55	1704			1+	
S.Peak	06	2212	2227	15	245	3997	S15	W37	2217	25	4	2	
Honolulu	06	2212	2228	16		3997	S13	W37	2218			2	
Ondrejov	07	b0637	0642	>05		4001	N07	W53				1	
Ondrejov	07	0813	0820	07		4001	N08	W52	0816			1	S-SWF
Capri-S	07	1333	a1356	>23	189	4002	S20	E10				1	G-SWF
S.Peak	07	1325	1410	45	200	4002	S20	E06	1340	22	3	1+	
Capri-S	07	1440	1456	16	165	4001	N12	W57				1	S-SWF
Capri-S	08	b1010	1026	>16	244	4001	N13	W70				1	S-SWF
Ottawa	08	1100	1347	167		4001	N09	W70				2	
Capri-S	08	1514	a1549	>35	175	4001	N13	W74				1	
S.Peak	08	b2312	2340	>28	140	4002	S17	W05	2325	15	2	1	Slow S-SWF
Mitaka	10	b0436	a0443	>07	275	4002	S16	W25				1	S-SWF
Capri-S	10	b0937	a0958	>21	146	3998	S29	W38				1	S-SWF
Wendel.	10	b0944	0955	>11		3998	S31	W37				1	
Ondrejov	10	b1045	1048	>03		4010	N09	E32				1	
Ottawa	10	1239	1315	36		3998	S31	W41	1242			1	
Ondrejov	10	1256	1309	13		3998	S33	W42				1+	
Capri-S	10	1258	a1315	>17	131	3998	S30	W38				1	
S Peak	10	1502	1530	28	155	3999	N19	W45	1507	15	2	1	
Capri-S	10	1502	a1517	>15	187	3999	N20	W35				1	
Ondrejov	10	1527	1538	11		4010	N10	E30				1	
Capri-S	11	0907	a0922	>15	175	3998	S30	W56				1	
Ondrejov	11	b1045	1052	>07		3998	S31	W50				1	Slow S-SWF
S.Peak	12	2225	2240	15	135	4012	S12	E27	2227	20	6	1	
Ondrejov	13	b0720	0731	>11		4009	S15	E08				1	S-SWF
Capri-S	13	b0810	a0845	>35	243	4012	S20	E39				2	S-SWF
Ondrejov	13	b0814	0830	>16		4012	S20	E39				1+	
Wendel.	13	b0820	0832	>12		4012	S18	E39				1	
Simeiz	13	1110	1140	30		4013	S38	E23				2	
Ondrejov	13	1512	1524	12		4002	S17	W70	1515			1	
Ondrejov	13	1635	1647	12		4018	S21	E52	1642			1	G-SWF
Wendel.	13	b1638	1650	>12		4018	S18	E52				1	
Ondrejov	14	b0513	0535	>22		4018	S23	E61				1+	
S.Peak	14	2337	~2400	~23	95	4018	S18	E38	2340	28	7	1	
Mitaka	15	b0011	a0028	>17		4021	S38	E85				1+	Slow S-SWF
Ondrejov	15	b0513	0518	>05		4021	S26	E76				1	
Wendel.	15	b0520	0602	>42		4021	S37	E75				1+	
Wendel.	15	0620	0658	38		4021	S37	E70	~0629			2+	
Capri-S	15	b0623	0639	>16	219	4021	S37	E70				1+	
Capri-S	15	0737	0814	37	486	4021	S18	E58				2+	
Ondrejov	15	0737	0813	36		4021	S19	E61				2	S-SWF
Wendel.	15	b0740	a0808	>28		4021	S18	E59				2	
NERA	15	0834	0845	11		4021	S35	E90				1	
NERA	15	0837	0840	03								1	
NERA	15	0838	0852	14		4021	S40	E80	0843			2	
Ondrejov	15	b0956	1005	>09		4012	S19	E08	1000			1	
Simeiz	15	1015	1040	25								1+	
Simeiz	15	1037	1054	17								2	

SOLAR FLARES

JUNE 1957

Observatory	Date June 1957	Time Observed Start UT	Time Observed End UT	Duration Min.	Total Area Mill.	McMath Plage Region Number	Approx. Position Lat. Mer. Dist.	Time Max. Phase UT	Max. Int. Arb.	Rel. Area of Max. Tenths	Importance	Provis. Ionospheric Effect
Ondrejov	15	b1108	1122	>14		4021	S38 E72	1112			1+	
Wendel.	15	1109	1142	33		4021	S37 E72	~1116			1+	S-SWF
Kiev	15	1113				4021	S37 E76				2	
Capri-S	15	1314	a1337	>23	107	4011	N26 W06				1	Slow S-SWF
Capri-S	15	1403	a1419	>16	233	4021	S37 E69				1+	
Capri-S	15	1458	a1510	>12	185	4021	S37 E69				1	
Capri-S	15	b1519	a1535	>16	233	4021	S37 E68				1+	Slow S-SWF
Ondrejov	15	b1519	1531	>12		4021	S37 E71	1521			1	
Capri-S	15	1552	1558	06	112	4018	S20 E45				1	G-SWF
Ondrejov	15	b1552	1558	>06		4018	S20 E47	1554			1	
Ondrejov	15	b1648	1652	>06		4021	S36 E69				1	
Ondrejov	15	1733	1740	07		4021	S36 E69				1	
S.Peak	15	2340	a2354	>14	103	4018	S16 E27	2342	17	7	1	
Ondrejov	16	b0444	0452	>08		4021	S38 E63				1	S-SWF
Ondrejov	16	b0451	0535	>44		4018	S15 E26				1+	
Wendel	16	b0512	0536	>24		4018	S17 E26				1+	
Schaus.	16	b0512	0536	>24		4018	S17 E26				1+	
Wendel.	16	b0611	0626	>15		4021	S38 E60				1	
Schaus.	16	b0611	0626	>15		4021	S38 E60				1	
Ondrejov	16	0717	0724	07		4021	S38 E63	0718			1	S-SWF
Capri-S	16	b0718	a0726	>08	228	4021	S38 E61				1	
Ondrejov	16	b0909	0918	>09		4024	N12 E78				1	S-SWF
Ondrejov	16	b1106	1112	>06		4018	S17 E19				1	
Capri-S	16	1107	1117	10	97	4018	S16 E17				1	
Ondrejov	16	b1307	1326	>19		4018	S15 E22				1	Slow S-SWF
Ondrejov	16	b1337	1343	>06		4011	N42 W32				1	
Ondrejov	16	b1415	1432	>17		4024	S15 E83				1	G-SWF
S.Peak	16	1612	1645	33	124	4018	S15 E18	1620	17	5	1	
Ondrejov	16	1613	1645	32		4018	S15 E21	1615			1+	Slow S-SWF
Capri-S	16	b1614	a1651	>37	136	4018	S15 E15				1+	
Capri-S	16	b1625	a1651	>26	136	4011	N36 W26				1+	
Ondrejov	16	b1631	1649	>18		4011	N29 W25				1	
Ondrejov	16	b1700	1717	>17		4021	S39 E60				1	G-SWF
Mt.Wilson	16	b1711				4021	S35 E55				1	
Ondrejov	16	b1800	1809	>09		4011	N29 W25				1	
S.Peak	16	2030	2040	10	101	4011	N33 W25	2032	17	7	1	S-SWF
S.Peak	16	2155	~2320	~85	135	4011	N28 W25	2157	18	2	1	
Ondrejov	17	0514	0534	20		4024	N11 E62				1	
Simeiz	17	0623	0645	22		4021	S40 E39				1+	S-SWF
Ondrejov	17	b0625	0634	>09		4021	S38 E50				1	
Simeiz	17	0656	0713	17		4018	S10 E16				1+	
Capri-S	17	0658	a0724	>26	160	4018	S15 E07				1+	
Ondrejov	17	1015				4018	S15 E10	1018			1	
S.Peak	17	1355	1500	65	289	4018	S15 E06	1438	17	2	2-	
Capri-S	17	1416	a1520	>64	146	4018	S15 E02				1+	
Ondrejov	17	b1437				4018	S14 E07				2	
McMath	17	b1440	a1515	>35		4018	S15 E05				2	
Ondrejov	17	1557					S01 E01	1558			1	S-SWF
Ondrejov	17	1647				4022	S19 E28				1	G-SWF
S.Peak	17	1655	1717	22	130	4018	S14 E05	1705	15	3	1	
S.Peak	17	1845	1922	37	240	4018	S17 E06	1852	18	7	2-	
S.Peak	17	2152	2202	10	123	4018	S16 E00	2155	15	8	1	
Mt.Wilson	18	b0017				4021	S35 E25				1	
Ondrejov	18	b0633	0640	>07		4024	N22 E55				1	G-SWF
Ondrejov	18	b0815	0822	>07		4010	N12 W67				1	

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Observatory	Date June 1957	Time Observed Start UT	Time Observed End UT	Duration Min.	Total Area Mill.	McMath Plage Region Number	Approx. Position Lat.	Approx. Position Mer. Dist.	Time Max. Phase UT	Max. Int. Arb.	Rel. Area of Max. Tenths	Importance	Provis. Ionospheric Effect
Capri-S	18	0814	0821	07	117	4010	N10	W75				1	
Capri-S	18	0914	a0925	>11	214	4024	N18	E59				1	
Ondrejov	18	b0917	0922	>05		4024	N23	E53				1	
Capri-S	18	b1036	a1105	>29	170	4017	N10	W10				1+	Slow S-SWF
Ondrejov	18	1038	1049	11		4017	N10	W05				1+	
Ottawa	18	1205	1217	12		4021	S39	E33	1208			1	Slow S-SWF
Ondrejov	18	b1206	1214	>08		4021	S38	E34				1	
Ondrejov	18	1330	1336	06		4024	N23	E53				1	
Ondrejov	18	1417	1421	04		4021	S38	E38				1	S-SWF
Ondrejov	18	b1436	1440	>04		4012	S05	W40				1+	Slow S-SWF
Capri-S	18	b1558	a1609	>11	73	4030	S17	E90				1	Slow S-SWF
Mt.Wilson	18	b1559				4030	S25	E85				1	
Ondrejov	18	1622	1628	06		4021	S35	E34				1	G-SWF
S.Peak	18	1812	1835	23	120	4023	N26	E42	1817	17	2	1	
Ondrejov	19	b0609	0713	>64		(4021)	S	E				2	
Capri-S	19	0612	0811	119	316	4021	S35	E20				2	S-SWF
Simeiz	19	0612	0709	57		4021	S38	E22				2	
Kiev	19	0616	0710	54		4021	S37	E23	0619			2	
Ondrejov	19	b0749	0753	>04		4017	N12	W12				1	G-SWF
Ondrejov	19	b1037	1104	>27		4024	N18	E38				1+	
Capri-S	19	1038	1057	19	185	4024	N18	E39				1	
Capri-S	19	b1608	1645	>37	365	4024	N20	E46				2+	S-SWF
S.Peak	19	b1610	1640	>30	327	4024	N20	E46	1614	35	3	2	
Tashkent	20	b0245	0258	>13		4022	S17	W20				1	
Mitaka	20	b0258	a0315	>17	184	4021	S36	E10				1	Slow S-SWF
Tashkent	20	0416	0431	15		4021	S34	E01	0417			1	
Mitaka	20	0440	0501	20		4024	N14	E24				1	G-SWF
Mitaka	20	0513	0522	09		4018	S17	W19				1	
Tashkent	20	b0515				4018	S18	W22				2	
Tashkent	20	b0532	0610	>38		4024	N14	E23	0552			1	
Capri-S	20	0830	a0842	>12	180	4023	N22	E21				1+	Slow S-SWF
Ottawa	20	1215				4023	N36	E11	1219			1	
Ottawa	20	1235	1245	10		4024	N18	E30	1237			1	Slow S-SWF
S.Peak	20	1547	1600	13	135	4021	S34	W07	1549	20	5	1	
Capri-S	20	1548	1600	12	107	4021	S33	W10				1	
Ottawa	20	1645	1702	17		4018	S18	W28	1649			1	Slow S-SWF
Mt.Wilson	20	b1817	1827	>10		4024	N15	E15				1	
Ottawa	20	1827				4024	N15	E15	1845			1	
S.Peak	20	1832	1915	43	176	4024	N12	E14	1847	20	3	1+	G-SWF
McMath	20	b1835	a1910	>35		4024	N15	E15				1+	
Honolulu	20	1844	1902	18		4024	N11	E13				1+	
Honolulu	20	2036				4030	S21	E58	2038			1	G-SWF
McMath	20	b2040				4030	S23	E55				1	
Honolulu	20	2346	2358	12		4024	N18	E27	2348			1	
Tashkent	21	b0524	0540	>16		4018	S16	W34				1	
Capri-S	21	b1155	a1226	>31	146	4021	S36	W01				1	G-SWF
Ottawa	21	1407				4021	S44	E03	1410			1	G-SWF
Capri-S	21	1408	a1420	>12	117	4021	S34	W07				1	
McMath	21	b1410				4021	S36	W05				1	
S.Peak	21	1425	1500	35	280	4024	N13	E02	1435	18	6	2	
Capri-S	21	1426	a1457	>31	146	4024	N13	E02				1	G-SWF
Ottawa	21	b1430				4024	N13	E04				1	
McMath	21	b1440				4024	N15	E05				1	
S.Peak	21	1605	1630	25	135	4021	S38	W08	1612	12	5	1	G-SWF
Capri-S	21	b1607	1631	>24	117	4021	S34	W11				1	

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McMath	21	b1610	a1630	>20		4021	S36	W05				1+	G-SWF
Mt.Wilson	21	b1615	1625	>10		4021	S35	W15				1	
S.Peak	21	1725	1742	17	315	4021	S34	W21	1730	18	8	2	G-SWF
McMath	21	b1730	a1737	>07		4021	S36	W05				1	
S.Peak	21	1740	1820	40	520	4024	N13	E01	1750	20	5	2	
McMath	21	b1742	a1814	>32		4024	N15	E05				2	Slow S-SWF
Honolulu	21	1742	1826	44		4024	N12	E02	1750			1+	
Mt.Wilson	21	b1948	1958	>10		4024	N15	E15				1	
Honolulu	21	1950	1962	12		4024	N19	E15	1952			1	
S.Peak	21	2007	2120	73	225	4018	S16	W44	2020	10	3	1	
Honolulu	21	2010	2106	56		4018	S15	W46	2014			2	G-SWF
McMath	21	b2023	a2110	>47		4018	S16	W40				1+	
S.Peak	21	2210	2340	90	380	4023	N13	W02	2245	20	3	2	G-SWF
Mt.Wilson	21	b2230	2250	>20		4023	N15	W05				2	
S.Peak	21	2340	a2347	>7	250	4021	S42	W10	a2347	12	5	1+	
Tashkent	22	0236	0257	21		4024	N23	E12	0241			2	S-SWF
Capri-S	22	0636	a0642	>06	189	4021	S37	W16				1+	S-SWF
Capri-S	22	1136	a1150	>14	97	4024	N16	W07				1	
S.Peak	22	1315	1335	20	175	4024	N21	E08	1320	20	8	1	
Ottawa	22	1317				4024	N20	E08	1321			1	
Capri-S	22	b1319	a1334	>15	107	4024	N21	E08				1	
McMath	22	b1321	a1330	>09		4024	N25	E07				1	
S.Peak	22	1335	1445	70	245	4030	S20	E38	1415	12	8	2-	Slow S-SWF
S.Peak	22	1438	1446	08	140	4021	S39	W20	1442	15	7	1	
Capri-S	22	b1447	a1502	>15	97	4011	N35	W90				1	
S.Peak	22	2020	2050	30	195	4030	S20	E34	2040		4	1	
Honolulu	22	b2038	2050	>12		4030	S21	E35				1	G-SWF
McMath	22	b2040				4030	S20	E35				1	
S.Peak	22	2052	2140	48	190	4021	S43	W17	2100	18	6	1	Slow S-SWF
McMath	22	b2055				4021	S35	W30				1	
Honolulu	22	2056	2072	16			S40	W68	2058			1	
S.Peak	22	2100	2120	20	175	4030	S22	E30	2105	15	4	1	
McMath	22	b2102	a2110	>08		4030	S20	E35				1	
Honolulu	22	2104	2110	06		4030	S21	E30	2106			1	
S.Peak	22	2147	2335	108	250	4024	N12	W15	2335	15	9	2-	G-SWF
Honolulu	22	2156				4024	N15	W15				1	
Tashkent	23	0316	0335	19		4028	N30	E14	0317			1	
Tashkent	23	0355	0412	17		4021	S35	W29	0357			1	
Simeiz	23	0820	0850	30		4024	N13	W20				1+	
Capri-S	23	b0830	0944	>74	267	4024	N13	W18				2	
Capri-S	23	b0905	0944	>39	136	4024	N22	W02				1	
Capri-S	23	1030	1108	38	185	4021	S30	W40				1	S-SWF
Ondrejov	23	b1031	1042	>11		4021	S34	W46				1+	
Capri-S	23	1131	a1207	>36	141	4024	N20	W05				1+	
Capri-S	23	1224	1303	39	267	4024	N22	W05				2	Slow S-SWF
Ondrejov	23	b1225	1313	>48		4024	N24	W05				1+	
S.Peak	23	b1252	1325	>33	116	4024	N20	W04	b1252	16	3	1	G-SWF
S.Peak	23	1340	1500	80	113	4018	S16	W70	1355	25	5	1	
Capri-S	23	1341	1429	48	292	4018	S16	W64				2	S-SWF
Ondrejov	23	b1343	1414	>31		4018	S16	W63				1+	
McMath	23	b1350				4021	S35	W28				1	
Tashkent	24	0333	0340	07		4024	N15	W26	0334			1	
Tashkent	24	0503	0523	20		4028	N28	W01				1	
Tashkent	24	b0513				4024	N22	W15	0516			1+	
NERA	24	0735	0815	40		4024	N30	W30				2+	

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Capri-S	24	b0735	a0801	>26		4024	N22	W23				2	S-SWF
Krasnaya	24	b0743	0818	>35		4024	N28	W29				2	
Capri-S	24	0845	0924	39	642	4024	N22	W14				3	
Krasnaya	24	b0850	0929	>39		4024	N21	W13				3	S-SWF
NERA	24	0850	0915	25		4024	N30	W30				3	
Capri-S	24	0943	a0958	>15	102	4021	S39	W36				1	
Mt.Wilson	24	b1415				4030	S15	E25				1	
S.Peak	24	2040	2102	22	232	4039	N07	E73	2050	14	2	1+	
Ondrejov	25	b0557	0603	>06		4039	N12	E63				1	
Ondrejov	25	1313	1319	06		4024	N12	W42				1	G-SWF
Capri-S	25	1354	1401	07	180	4024	N21	W30				1	
Ondrejov	25	b1358	1402	>04		4024	N15	W44				1	
Capri-S	26	b1155	1212	>17	112	4041	S14	E60				1	
Ottawa	26	1302				4039	N13	E48				1	Slow S-SWF
Capri-S	26	b1306	1342	>36	204	4039	N13	E45				1	
S.Peak	26	1500	1527	27	113	4030	S21	W20	1515	15	9	1	S-SWF
S.Peak	26	1600	1720	80	134	4030	S22	W22	1615	15	5	1	
S.Peak	26	1615	1740	85	106	4024	N20	W46	1655	16	5	1	
Honolulu	26	2202				4039	N15	E42	2204			1	
Kharkov	27	b1109	1154	>45		4024	N17	W76	1112			2+	
Capri-S	27	b1113	a1135	>22	233	4024	N14	W76				1	
Ondrejov	27	1155	1253	58		4024	N17	W55	1223			2	
Kharkov	27	~1155	1253	~58		4024	N26	W54	1201			2+	G-SWF
Capri-S	27	1208	a1247	>39	443	4024	N21	W56				2	
S.Peak	27	b1228	1255	>27	148	4024	N21	W55	b1228	16	9	1	Slow S-SWF
S.Peak	27	1312	1350	38	204	4030	S26	W29	1317	25	2	2-	
Capri-S	27	1313	a1331	>18	233	4030	S25	W27				1+	G-SWF
Ottawa	27	b1317				4030	S24	W27				1	
Capri-S	27	1346	1358	12	160	4039	N08	E34				1	
Ottawa	27	b1353				4039	N15	E48				1	
Capri-S	27	1534	1546	12	175	4024	N21	W58				1	
Capri-S	27	1558	1619	21	156	4024	N21	W58				1	
S.Peak	27	2330	2342	12	169	4039	N12	E32	2335	15	7	1	
S.Peak	27	2330	2345	15	148	4024	N20	W63	2335	16	4	1	G-SWF
Honolulu	27	2332	2344	12		4024	N22	W61	2334			1	
Krasnaya	28	0700	0930	150		4039	N09	E28	0722			3	S-SWF
Capri-S	28	0706	0918	132	559	4039	N09	E29				2+	
Krasnaya	28	b0707	1007	>180		4039	N11	E26	0720			2	
Utrecht	28	b0825	1015	>110		4039	N11	E29	0835			1+	
Kharkov	28	0855	1024	89		4024	N28	W65	0900			2	
Capri-S	28	0857	a0918	>21	175	4024	N21	W65				1	
Capri-S	28	b0924	0934	>10	219	4041	S23	E41				1	
Capri-S	28	1223	1302	39	321	4039	N12	E24				2	
Ondrejov	28	b1227	1312	>45		4039	N19	E13				2	Slow S-SWF
S.Peak	28	b1246	1315	>29	165	4039	N12	E21	1249	25	7	1	
Honolulu	28	2208	2220	12		4039	N11	E33	2210			1	
Capri-S	29	0847	0914	27	219	4043	S13	E48				1	
Capri-S	29	1229	a1247	>18	194	4030	S17	W54				1	
S.Peak	29	1345	1402	17	100	4044	S30	E87	1350	20	8	1	
McMath	29	b1345	a1352	>07		4044	S26	E68				1	Slow S-SWF
Capri-S	29	1346	1402	16	233	4044	S30	E73				1+	
S.Peak	29	1400	1450	50	125	4039	N08	E08	1412	14	8	1	
Capri-S	29	1405	a1432	>27	121	4039	N09	E07				1	G-SWF
McMath	29	b1408	a1414			4039	N12	E07				1	
Capri-S	29	1445	1454	09	204	4044	S29	E78				1	S-SWF

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Capri-S	30	0821	0910	49	253	4044	S26	E57				2	
Schaus.	30	b0824	0900	>36		4044	S32	E56				1+	S-SWF
Krasnaya	30	b0827	0847	>20		4044	S28	E64				1+	
Capri-S	30	b0918	a0937	>19	126	4046	N14	E66				1	
Kharkov	30	b0927				4039	N09	W01	0927			2	
Capri-S	30	0926	1316	230	535	4039	N09	W03				2+	S-SWF
Andrejov	30	b0927	1107	>100		4039	N08	W07				2	
Krasnaya	30	0928	0937	59		4039	N08	E02				2	
Schaus.	30	b0945	1332	>227		4039	N07	W02				2	
Schaus.	30	b0945	1332	>227		4039	N13	W00				2	

Subflares noted as follows (Date, time (UT), coordinates):

S. Peak:	unmarked	Schaus. :	a
Capri-S:	+	Ottawa :	b
McMath :	++	Honolulu:	c
Mitaka :	*	Ondrejov:	d
Wendel.:	**		

June 01, b1315 (S27,W38)
1519 (S20,E37)
b1533 (S27,W40)
b1618 (S27,W41)
b2224 (N20,E88)
2331 (S19,W02)
02, b0717 (S19,E30)**
b0746 (S20,W06)**
0755 (S16,E05)a
1600 (S20,E24)
1620 (S21,E71)
2155 (S18,W08)
2155 (N19,W90)
03, 0203 (N17,E66)*
1455 (S20,E60)
b1842 (S20,W22)
2000 (S20,E57)
04 0521 (S14,E03)*
0751 (S15,E00)a
0753 (S15,W20)*
1708 (S22,W38)
2135 (N10,W23)
2212 (S24,W39)
05, b0730 (S13,W38)+
b0735 (S17,E36)+
1259 (S14,W17)b
1300 (S23,E27)b
1315 (S20,W17)
1321 (S21,W26)b
1355 (S12,E29)b
1402 (S14,W19)
1406 (S14,W19)b
1450 (N14,E26)b
1522 (S05,W75)
2030 (S34,E14)
2142 (S20,W22)
2215 (N10,W36)
06, 0010 (N11,W37)c
0044 (S19,W24)c
1220 (S13,W51)+
b1312 (S15,W28)++
1340 (S18,W60)
b1343 (S18,W60)++
1522 (N12,E12)

June 06, 1527 (S25,W26)
1528 (S24,W20)+
1632 (N10,W45)
1633 (N10,W46)**
1635 (S21,W35)
1658 (S18,W58)**
1700 (S18,W58)
1742 (S22,W34)
1818 (S18,W60)
1840 (S15,W05)
2142 (S15,W38)
2147 (S18,W63)
2350 (S20,W38)
07, 0637 (N11,W54)+
0813 (N12,W55)+
0925 (S22,E10)d
0936 (S17,E18)+
b1218 (N11,W58)+
1330 (N22,E90)
1400 (N11,W57)
1438 (N11,W58)
1520 (N10,W58)
1638 (N10,W59)
1815 (S17,W74)
1900 (S17,W74)
1912 (N02,E90)
1930 (S17,W74)
08, 0709 (N36,E90)+
1312 (N11,W69)
1415 (N18,W16)+
1512 (N11,W69)
1520 (N32,E88)
1602 (N12,W70)
b1615 (S21,W08)
1640 (N12,W70)
1835 (N10,W73)
2222 (S15,W07)
09, b0819 (S13,W15)+
0900 (S12,E49)+
1307 (S18,E90)
1352 (S17,E90)
b1452 (S13,W18)+
1452 (S17,W22)
1520 (N11,W25)

June 09, 1532 (N11,W85)
1542 (S20,W25)
1620 (N11,W90)
1715 (N33,E70)
2002 (S17,W25)
10, 1154 (S33,W40)b
b1245 (S32,W42)
1330 (S21,W90)
1343 (S30,W46)b
1357 (S33,W42)b
1525 (N11,E31)
1545 (S17,E74)
1705 (N34,E57)
1757 (S21,W85)
1915 (S30,W45)
1952 (S31,W46)
2038 (N31,E43)
2155 (S27,W90)
2310 (S17,W30)
11, b0726 (S32,W56)+
1248 (S15,W90)
1258 (S18,E51)
1400 (S32,W56)
1410 (S14,W90)
1555 (S10,E18)
2148 (S18,E54)
2205 (S14,W90)
2250 (S15,W90)
12, 1322 (N37,E37)
1522 (S18,E70)
1600 (N12,E04)
1812 (S14,E72)
1825 (S18,E65)
13, b1334 (S18,E22)+
1355 (S19,E56)
1512 (S16,W78)
1530 (N30,E16)
1530 (N26,E19)d
1535 (N30,E10)++
b1543 (N32,E18)+
1635 (S20,E53)
1702 (N14,W90)
2102 (S21,E52)
2145 (N13,E57)

June 14, 0749 (S27,W61)**
~1745 (S38,E88)
1855 (N30,E01)
1915 (N12,E90)
~2045 (S38,E88)
~2235 (S38,E88)
15, 0723 (S37,E59)a
b0950 (S17,E05)+
1305 (N36,W11)
1312 (N28,W08)
1320 (S39,E79)
1352 (S40,E80)
1455 (S40,E80)
1515 (S39,E79)
1532 (N20,E90)
1536 (S20,W90)
1547 (S22,E48)
1552 (N37,W04)
1615 (S41,E79)
1618 (S15,E72)
1625 (N10,E90)
1627 (N12,E90)
1645 (S42,E79)
1702 (S15,E72)
1710 (S41,E79)
1727 (S40,E73)
1750 (S39,E75)
1800 (N19,E88)
1827 (S40,E75)
1857 (S41,E75)
1902 (S42,E75)
2012 (S14,E63)
2055 (S39,E70)
2105 (N11,E87)
2122 (S42,E78)
2140 (S40,E73)
2142 (S22,E40)
2157 (S24,E41)
2322 (S42,E76)
2342 (N13,W16)
16, 0723 (S37,E59)**
0823 (N10,E70)+
1248 (S16,W21)
1322 (N21,E79)

SOLAR FLARES

JUNE 1957

Subflares noted as follows (Date, time (UT), coordinates):

S. Peak:	unmarked	Schaus. :	a
Capri-S:	+	Ottawa :	b
McMath :	++	Honolulu:	c
Mitaka :	*	Ondrejov:	d
Wendel.:	**		

June 16, 1415 (S08,W40)
b1422 (S16,E36)+
1532 (N34,W25)
1627 (N33,W24)
1700 (S40,E60)
1757 (N34,W27)
1857 (N33,W25)
1920 (N11,E68)
2122 (S20,E18)
2142 (N10,E14)
2242 (S40,E57)
2300 (S40,E57)
2305 (S17,E39)
17, b0935 (S35,E47)+
b1136 (N35,W35)+
1251 (S20,E15)
1255 (N38,W32)
1400 (N16,E57)
1423 (N13,W60)+
1425 (N32,W44)
1505 (S15,E05)
1600 (N12,E06)
1627 (N12,E06)
1648 (S20,E28)
1652 (N10,E56)
1757 (N27,E57)
1950 (N20,E70)
2120 (S39,E47)
18, b0628 (N12,W71)*
0630 (N10,W80)d
1225 (S16,W07)d
1233 (S18,W08)b
1415 (S38,E33)
1417 (S40,E34)b
1429 (S14,E12)b
1430 (S15,E12)
1430 (S37,E33)
1433 (N34,W53)b
1437 (N35,W51)
1500 (N18,E45)
1500 (N42,E42)d
b1601 (S18,E90)
1605 (S10,W64)
1648 (S39,E30)
1830 (N18,E44)
2005 (S15,E10)
2058 (N16,E54)
2110 (S37,E16)
2135 (S36,E18)
2257 (S38,E27)
2302 (N15,E38)

June 19, 1026 (S19,W10)d
1030 (S15,W75)d
b1216 (N18,E38)+
1442 (S38,E21)
1502 (N23,E37)
1655 (S38,E23)
1816 (N17,E37)
1942 (S38,E16)
2314 (S16,W19)
2358 (S38,E13)
20, b0451 (S21,E70)*
0827 (S33,W07)+
b1233 (S36,E11)+
b1539 (S37,E03)+
1647 (S17,W29)
1657 (N14,E15)b
1700 (N14,E15)
1706 (S36,E05)b
1712 (S38,E05)
1722 (S38,E06)
1742 (S38,E06)
1822 (N19,E17)
1831 (N19,E29)b
1832 (N17,E28)
2025 (N11,E12)
2025 (S20,E59)
2155 (S38,E05)
2202 (S16,W33)
21, b0800 (S21,E50)+
b1101 (S21,E48)+
1407 (S38,W02)
1417 (S18,E48)a
1526 (N19,E18)
1527 (N18,E19)+
b1530 (N15,E05)++
1540 (N17,E11)
b1543 (S36,W05)++
1937 (N19,E15)
b1948 (N15,E05)++
2242 (S33,W19)
2330 (N50,W70)
22, 0621 (S20,E42)+
b1226 (N16,W07)+
1433 (N18,E04)
1445 (N35,W90)
1930 (S39,W20)
1934 (S40,W12)c
1948 (N26,W11)
2120 (N20,E04)
23, 1101 (N20,W05)+
b1155 (S16,E25)+

June 23, b1252 (S25,E22)
b1358 (S32,W40)
1435 (S32,W41)
b1518 (S38,W42)
1540 (S16,W68)
1605 (S32,W41)
1610 (S25,E15)
1630 (N25,W14)
1640 (N18,W21)
1710 (N10,E90)
b1748 (S40,W35)
1755 (S33,W42)
2213 (N26,W16)
24, 1424 (S18,E19)
1530 (N17,W03)
1610 (S24,E10)
1640 (N25,E51)
1752 (N13,E74)
1817 (N20,W20)
1825 (N11,W40)
2110 (N12,E70)
2255 (N20,W24)
25, b0409 (N20,W23)*
b0933 (N14,W43)+
b1250 (S26,E01)
1313 (N14,W45)
b1322 (N14,W45)
1342 (N13,E62)
1354 (N18,W34)
1531 (N12,E60)
1721 (N22,W33)
1755 (S34,W65)
1815 (N12,W50)
1832 (S15,E75)
1910 (N18,W38)
1917 (N14,W53)
2040 (S20,W10)
2132 (N20,W34)
2215 (S21,E26)
2320 (N13,E57)
26, 0948 (S19,W17)+
b1250 (S21,W80)
b1250 (S34,W78)
1250 (N11,E49)
1307 (N20,W46)
1308 (N18,W42)b
1437 (S33,W80)
1445 (N15,W60)
1514 (S19,W19)+
1625 (N11,W68)
1705 (N13,E48)

June 26, 1948 (S20,W18)c
b2013 (S25,E66)
2130 (N14,E45)
2155 (N15,E44)
2215 (S21,W24)
2257 (S22,W25)
2340 (S21,W25)
27, b1129 (N13,E33)+
1250 (S41,W89)
1317 (N21,W64)
1347 (N08,E36)
1352 (N12,E48)+
1352 (N13,E49)
1402 (S22,W34)
1422 (N10,E34)
b1550 (N12,E37)
1558 (N20,W59)
1650 (N14,E33)
1730 (N08,E36)
2040 (S44,W89)
2130 (S18,W30)
2202 (N24,W60)
2205 (N13,E35)
2252 (N13,E35)
2255 (S24,W33)
2310 (S13,E61)c
2312 (S13,E62)
28, 1430 (N14,W90)
1555 (S15,E38)
1652 (N10,E22)
1805 (S16,E38)
29, b0750 (N12,E09)+
b1250 (S23,W54)
1445 (S32,E87)
b1450 (S26,E68)++
1530 (S20,W47)
1555 (S32,E87)
1630 (S32,E87)
1722 (S32,E87)
1740 (S16,E23)
1740 (N09,E09)
1802 (S33,E88)
b1812 (S26,E68)++
1820 (S11,E35)
30, b0712 (N17,E68)+
1835 (N12,E64)
1850 (N10,W09)
1902 (N12,E64)
1945 (N13,W12)
2335 (N08,W11)

CORRECTIONS TO SUBFLARES REPORTED BY SACRAMENTO PEAK

CRPL-F No.	Date	Time (UT)	Coord. Should Be
	Apr.		
153	19	1742	(N27,E37)
153	26	1252	(S12,W47)
153	26	1350	(S04,E56)
153	26	1657	(N30,W47)

IONOSPHERIC EFFECTS OF SOLAR FLARES

(SHORT-WAVE RADIO FADEOUTS)

MAY 1957

May 1957	Start UT	End UT	Type	Wide-spread Index	Impor-tance	Observation stations	Known Flare, UT CRPL-F 154B
3	1319	1335	Slow S-SWF	4	1	AN, BE, HU, MC	
3	1936	2015	G-SWF	3	1	AN, MC, PR	1920
5	0145	0230	S-SWF	5	3-	AN, OK, TO	b0145
5	1431	1520	Slow S-SWF	3	1	HU, MC	1434
6	0535	0620	S-SWF	1	2	OK	
6	1140	1210	S-SWF	3	1+	BE, NE	1143
6	1622	1655	Slow S-SWF	5	1+	BE, HU, MC, PR, WS, CR	
6	2348	2422	Slow S-SWF	5	2-	AN, OK, WS, TO	b2345
7	1021	1105	G-SWF	1	2	NE	1016
8	0502	0530	S-SWF	5	2	TO, NE	b0500
8	2332	2347	Slow S-SWF	4	1	AN, TO	2316
9	0455	0514	S-SWF	1	2	TO	b0441
9	1740	1755	Slow S-SWF	4	1	BE, HU, MC, PR	
9	2327	2337	S-SWF	5	1	AN, TO, SY	
10	0012	0040	Slow S-SWF	5	1	AN, OK, TO	0008
10	0523	0550	S-SWF	5	1	OK, TO	b0526
10	0707	0740	Slow S-SWF	1	1	NE	0702
11	1650	1710	Slow S-SWF	3	1	HU, MC, PR	
12	0735	0758	S-SWF	1	1	NE	b0738
12	1207	1245	Slow S-SWF	5	1+	AN, BE, MC, PR, NE, CW**	1202
12	1510	1610	G-SWF	5	1+	BE, HU, MC, PR	
12	1715	1752	Slow S-SWF	4	1+	BE, MC, PR, CR	~1715
13	0214	0244	S-SWF	2	2	TO	0218
13	0337	0347	S-SWF	1	2	TO	0341
13	1238	1255	Slow S-SWF	5	1	BE, MC, PR, NE, CW**	
13	1309	1338	Slow S-SWF	5	1+	BE, MC, PR, NE, CR	b1305
13	1515	1538	S-SWF	5	1+	BE, HU, MC, PR, CR	1516
14	0053	0113	S-SWF	5	2-	OK, TO	
14	0222	0324	S-SWF	5	3	OK, TO, CW+	
14	1042	1058	Slow S-SWF	1	2	NE	
14	1328	1410	G-SWF	5	2	BE, HU, MC, PR, WS, CR	1310
14	1420	(1435)	S-SWF	5	2	AN, BE, HU, MC, PR, WS, NE, TO	1418
14	1435	1502	S-SWF	5	3-	AN,BE,HU,MC,PR,WS,NE,SW,TH,TO,RCA*,CW***	b1426
14	1656	1723	Slow S-SWF	4	1	BE, MC, PR, CR	
14	1732	1758	Slow S-SWF	4	1-	BE, MC, PR	
14	1838	1903	S-SWF	5	1+	AN, BE, MC, PR, WS, CR, TO	1840
14	2000	2040	S-SWF	5	2	AN, BE, HU, MC, PR, WS	b2002
15	1235	1305	G-SWF	3	1-	MC, NE	1234
15	1407	1423	S-SWF	5	1	BE, MC, PR, WS, NE	b1408
15	1815	1835	Slow S-SWF	1	1-	HU, PR	1815

IONOSPHERIC EFFECTS OF SOLAR FLARES

(SHORT-WAVE RADIO FADEOUTS)

MAY 1957

May 1957	Start UT	End UT	Type	Wide-spread Index	Impor-tance	Observation stations	Known Flare, UT CRPL-F 154B
15	2320	2340	S-SWF	5	2	OK, TO	2320
15	2353	2416	S-SWF	1	2	TO	0003
16	0348	0428	Slow S-SWF	1	2	TO	b0350
16	1243	1310	S-SWF	5	2-	AN,BE,HU,MC,PR,CR,NE,SW,TH,RCA*,CW**,CW***	1242
17	0043	0130	S-SWF	5	2-	AN, TO	b0046
18	0808	0850	S-SWF	5	2	AN, OK, DA, NE, SW, TH, TO, CW**, CW***	b0810
18	1359	1432	Slow S-SWF	3	1-	HU, MC, PR	
18	1602	1625	Slow S-SWF	4	1-	HU, MC, PR	
20	1352	1432	S-SWF	5	1+	BE, HU, MC, PR, NE	
21	0206	0226	Slow S-SWF	3	1	TO	0204
21	1212	1232	Slow S-SWF	5	1	BE, MC, PR, CW**	b1208
21	1858	1952	Slow S-SWF	5	2	AN, BE, HU, MC, PR, CR	1856
23	1800	1832	G-SWF	4	1	HU, MC, PR, CR	1800
24	1609	1636	Slow S-SWF	5	2	AN, BE, HU, MC, PR, WS, NE, TO, CR, DA	b1617
25	1437	1458	S-SWF	5	2-	BE, HU, MC, PR, WS, NE	b1438
25	1545	1610	S-SWF	5	1+	BE, HU, MC, PR, CR, NE, TR	1540
26	2040	2120	G-SWF	3	1-	AN, MC, PR	2040
27	1230	1425	G-SWF	3	1	MC, PR, WS	
28	0019	0036	S-SWF	3	1+	OK, TO, WS	
30	1400	1415	Slow S-SWF	3	1	BE, MC, PR	
30	1622	1640	S-SWF	3	1	BE, MC, PR	1620
30	1705	1720	S-SWF	4	1+	BE, MC, PR, CR	
30	1735	1752	Slow S-SWF	4	1	BE, MC, PR, CR	
30	2040	2120	Slow S-SWF	2	1+	BE, MC	
31	0909	1008	S-SWF	4	2-	AN, NE, CW***	
31	1305	1420	Slow S-SWF	4	1	BE, MC, PR, WS	1258
31	1554	(1630)	Slow S-SWF	4	2-	BE, MC, PR, CR	1558
31	1630	1705	G-SWF	5	2-	BE, HU, MC, PR, CR	
31	1905	1919	Slow S-SWF	3	1	BE, HU, PR	1905
31	2115	2140	Slow S-SWF	3	1	AN, BE, MC, PR	

CR Cornell.
SY Sydney, Australia.
TH The Hague, Netherlands.
DA Darmstadt, Germany.
NE Nederhorst den Berg, Netherlands.
SW Enköping, Sweden.

TO Hiraiso Radio Wave Obaervatory, Japan.
TR Troy, New York.
RCA* RCA Communications, Inc., Riverhead, N.Y.
CW** Cable and Wireless, Somerton, England.
CW*** Cable and Wireless, Brentwood, England.
CW+ Cable and Wireless, Singapore.

SOLAR RADIO WAVES (OTTAWA)--2800 MC

OUTSTANDING EVENTS

JUNE 1957

June 1957	Type*	Start UT Hrs:Mins	Duration Hrs:Mins	Maximum Time UT Hrs:Mins	Maximum Peak Flux	Remarks
1	2	10 58.5	3	10 59.7	18	
1	6	12 53.4	11	12 58.3	270	
	4		25		8	
1	2	14 36.2	2	14 37.1	15	
1	7	15 13.5	21	15 21	23	
1	3	17 55	1 30	18 13	12	
1	1	18 19.5	2	18 20.5	7 ←	Superimposed on Rise and Fall
1	Precursor		5.7		6	
	2	21 08.3	6	21 10	80	
	4		1 35		16	
1	3	23 30	30	indet.	10	
1	6	23 38.5	6	23 41.5	98 ←	Superimposed on Rise and Fall
2	6	15 12.5	23.5	15 23	66	
	4		44		8	
2	2	16 00.2	1.5	16 00.8	23 ←	Superimposed on Post Increase
3	6	10 42	21	10 51.2	250	
	4		45		12	
3	3	13 17	2 20	13 55	9	
3	2	13 18.5	3	13 20.5	22 ←	Superimposed on Rise and Fall
4	1	19 33.5	3.5	19 35.2	5 ←	doubtful
5	2	13 26.5	8	13 28.2	725	
	4		1 10		9	
6	6	11 29	1.5	11 29.8	525	
	4		4		8	
6	1	12 19	3.5	12 20.5	7	
6	1	12 55	2	12 55.5	7	
6	1	16 59.5	1	17 00	5	
6	1	17 47	2.5	17 47.8	5	
6	1	18 16	1	18 16.5	4	
6	1	21 44	1	21 44.5	3	
6	3	22 13	14	indet.	4	
6	6	22 15	3	22 16.5	18 ←	Superimposed on Rise and Fall
7	1	11 30.5	4	11 31	10	
7	1	12 18.8	1	12 19.2	16	
7	1	20 57.5	2	20 58	7	
8	1	11 13	1	11 13.5	7	
8	2	19 03.2	3	19 03.9	16	
8	3	19 15	20	19 17.5	7	
10	3	15 06	4 30	15 35	12	
10	1	15 08	2	15 08.8	4 ←	Superimposed on Rise and Fall
10	Group (2)	23 11.5	3.2			
	1	23 11.5	1.5	23 12.2	4	
	1	23 14	0.7	23 14.3	4	
11	6	22 48.5	4.5	22 49.3	22	
11	1	23 41.5	1	23 42	7	
12	1	13 22.5	2	13 23.5	7	
12	3	14 17	3 30	15 20	22	
12	1	15 23.5	2	15 24.5	7 ←	Superimposed on Rise and Fall
12	1	19 40.5	3	19 41.2	7	
12	1	20 06	4	20 08	5	doubtful

* See page 6.

OUTSTANDING EVENTS

JUNE 1957

June 1957	Type*	Start UT Hrs:Mins	Duration Hrs:Mins	Maximum Time UT Hrs:Mins	Maximum Peak Flux	Remarks
14	1	11 57	1	11 57.2	6	
14	3	17 22	5	17 23.2	8	
14	1	17 23.8	0.2	17 23.9	28	Superimposed on Rise and Fall
14	1	18 56.9	1	18 57.1	52	
14	1	22 06	1.5	22 06.5	6	
14	2	23 39	4	23 40	44	
15	3	11 16	28	indet.	8	
15	Group (2)	11 16	12			Superimposed on Rise and Fall
	2	11 16	3	11 17	16	
	2	11 24	4	11 25	32	
15	Group (2)	16 48.8	3.2			
	1	16 48.8	0.5	16 49	3	
	1	16 50.5	1.5	16 50.7	8	
15	1	18 03	2	18 03.7	7	
16	2	11 07	2	11 07.7	28	
16	1	11 46.5	2	11 47.3	4	
16	1	16 23	2.5	16 23.5	5	
16	3	17 57.5	10	17 58.2	4	
16	2	20 30	1.2	20 30.5	96	
	4		9		8	
17	1	22 27.5	2	22 28.2	4	
18	1	18 50	1	18 50.3	10	
19	3	14 45	5 30	16 05	15	
19	1	15 56	1.5	15 56.5	7	Superimposed on Rise and Fall
19	6	16 08.8	10	16 10.2	2325	
	4		50		24	
19	1	18 13.5	4.5	18 14.8	7	
19	1	21 02.7	1.5	21 03	6	
19	2	22 06	6	22 07.3	50	
	4		25		9	
19	1	24 12	2	24 13	7	In sunset osc.
20	2	12 35.8	2	12 36.5	30	
	4		23		7	
20	2	15 48	2.5	15 49.1	30	
20	1	16 17.5	2	16 18.3	5	
20	1	17 01	3	17 03	7	
20	3	18 30	23	18 43	10	
20	Group (2)	18 31.5	6			Superimposed on Rise and Fall
	2	18 31.5	3.5	18 31.9	80	
	2	18 35	2.5	18 35.2	43	
20	3	21 48	1	22 04	7	
20	7	23 47	25	23 55.5	85	Near sunset osc.
21	3	14 05	40	14 15	7	
21	Group (3)	14 05	13			Superimposed on Rise and Fall
	1	14 05	1	14 05.5	7	
	1	14 10	2	14 10.4	16	
	2	14 15.5	2.5	14 16	55	
21	1	15 38.5	0.5	15 38.7	15	
21	7	16 09	1 25	17 27.5	12	
21	2	17 41	7	17 44	180	
	4		>6 20		24	
21	3	20 10	1 5	20 11.5	8	Superimposed on Post Increase

* See page 6.

SOLAR RADIO WAVES (OTTAWA)--2800 MC

OUTSTANDING EVENTS

JUNE 1957

June 1957	Type*	Start UT Hrs:Mins	Duration Hrs:Mins	Maximum Time UT Hrs:Mins	Maximum Peak Flux	Remarks
21	2	20 13	3	20 14	100	Superimposed on Rise and Fall
21	3	22 11	1 40	22 40	22	Superimposed on Post Increase
21	2	22 44	2.5	22 44.9	30	Superimposed on Rise and Fall (30, 19)
21	1	23 36.2	1	23 36.5	19	
22	2	12 25	3	12 25.6	8	
22	1	13 20.2	1	13 20.3	60	
22	2	14 33.3	2	14 33.9	95	
	4		20		12	
22	1	15 31.5	2	15 32.5	5	
22	2	19 34.8	2	19 35.4	50	
	4		25		7	
22	3	20 53.8	3	22 36	25	
22	6	20 53.8	4.2	20 55.5	125	Superimposed on Rise and Fall (125 through 20)
	4		13		14	
22	2	21 20.5	6.5	21 22.5	11	
22	Precursor		5.5		7	
	2	21 54	16.5	21 55.5	22	
22	2	23 46	4	23 47.5	20	
23	2	12 23	7	12 27.3	30	
23	1	12 59	6	13 02	6	
23	3	13 41	14	13 44	15	
23	3	16 08	2	16 19	9	
23	1	16 11.2	2	16 12.2	7	Superimposed on Rise and Fall
25	2	13 55.3	8	13 56	190	
25	1	17 38.5	2.5	17 39.7	7	
25	1	18 32.6	2	18 33.7	8	
26	Group (2)	13 01.5	8			
	1	13 01.5	4	13 02.2	12	
	1	13 07.5	2	13 08.5	11	
26	1	16 50.8	0.5	16 51	5	
26	2	17 07.3	2	17 07.6	21	
26	3	17 37	8	17 37.7	4	
26	2	19 46.1	2	19 46.7	20	
27	1	11 09.5	2	11 10	7	
27	Group (2)	13 13	9			
	6	13 13	4	13 13.4	15	
	1	13 21	1	13 21.5	4	
27	3	17 13	30	17 20	7	
27	2	17 58.5	2.5	17 59.3	29	
	4		37		8	
28	3	10 20	55	indet.	7	
28	2	10 25	4	10 26.5	15	Superimposed on Rise and Fall
28	2	12 21.5	15	12 28.8	355	
	4		1 45		15	
28	1	21 53	1.5	21 53.6	12	
28	1	24 13	2.5	24 14.2	30	In sunset osc.
30	2	12 15	15	12 20	16	
	4		1 10		6	
30	2	12 40	23	12 46.5	32	Superimposed on Post Increase

* See page 6.

SOLAR RADIO WAVES (OTTAWA)--2800 MC

HOURS OF OBSERVATION: April-June 1957

OBSERVING PERIOD: 1030 UT - 2400 UT (approx.)

with the following exceptions:

(1) No continuous records: 1430, May 17 - 1500, May 22.

(2) Variations in time of start of observations:

April 20	1145
May 23	1515
May 24	1420
May 27	1235
June 8	1720
June 9	1745
June 19	1245
June 29	1515

(3) Variations in time of end of observations:

May 23	2100
May 26	2310
June 8	2145
June 18	2010
June 30	1610

(4) No observations: June 23, 1855 - 2150

(5) Interruption of approximately 20 minutes for calibration purposes during the interval from 1500 - 1900, daily; from May 22 to June 25, inclusive.

SOLAR RADIO WAVES (CORNELL)--200 MC

3-HOURLY FLUX

JUNE 1957

June 1957	Flux Hours UT 12-15	Flux Hours UT 15-18	Flux Hours UT 18-21	Variability Hours UT 12-15	Variability Hours UT 15-18	Variability Hours UT 18-21	Observing Periods Hours UT
1	[5.60	2.35	1.75]	[1	1	1]	1230 - 2000
2	[1.60	2.50	1.90]	[1	1	1]	1235 - 2005
3	[3.85	3.00	3.90]	[2	1	1]	1245 - 1435, 1520 - 2010
4	[3.60	3.40	3.40]	[1	2	2]	1240 - 1320, 1420 - 2000
5	[1.95	1.95	1.95]	[1	1	2]	1245 - 2010
6	[1.40	1.40	1.40]	[1	0	0]	1250 - 2010
7	[1.40	1.40	1.40]	[0	0	0]	1240 - 1945
8	[1.40	1.40		[1	1		1300 - 2005
9	[1.40	1.45	1.35]	[1	0	0]	1240 - 2000
10	[1.55	1.40	1.40]	[1	0	0]	1240 - 1955
11	[1.40	1.50	1.40]	[0	0	0]	1240 - 1730, 1755 - 2000
12	[1.40	1.40	1.40]	[0	0	1]	1230 - 2000
13	[1.60	1.90	1.85]	[1	1	1]	1245 - 2005
14	[1.45	1.40	1.40]	[1	0	*]	1240 - 2025
15	[5.25	7.75	5.00]	[3	2	2]	1235 - 2005
16	[[2.45	2.55	2.95]	[[1	1	2]	1235 - 2000
17	[4.35	6.70	10.2]	[2	2	2]	1240 - 2005
18	[10.6	7.05	6.95]	[2	1	1]	1255 - 2015
19	[9.40	13.9	10.8]	[2	2	2]	1250 - 2010
20	[9.40	11.0	10.6]	[2	2	2]	1250 - 2015
21	[8.60	11.7	12.5]	[2	2	2]	1250 - 2015
22	[12.2	15.5	14.8]	[2	2	2]	1230 - 2000
23	[>22.4	19.0	11.4]	[2	2	2]	1255 - 2000
24	[15.8	13.2	12.5]	[3	2	2]	1200 - 2005
25	[3.75	3.55	3.70]	[2	2	2]	1250 - 2005
26	[11.7	10.2	8.00]	[2	2	2]	1240 - 2005
27	[8.20	8.40	5.90]	[2	2	2]	1250 - 2020
28	[8.35	3.60	3.70]	[1	1	1]	1240 - 2005
29	[3.25	2.85	3.30]	[2	2	2]	1230 - 2015
30	[5.15	3.45	4.20]	[2	2	2]	1230 - 2000

[= first hour missing.
[[= first two hours missing.
] = last hour missing.

Flux in terms of KTB.
Quiet sun = 1.40 KTB.
* = Lightning.

SOLAR RADIO WAVES (CORNELL)--200 MC

OUTSTANDING EVENTS

JUNE 1957

June 1957	Type	Start UT	Duration Minutes	Maximum Inst. Flux	Maximum Smd. Flux	Remarks
1	9	1252 1/2	5 1/2	>11.7	>11.7	off-scale
1	9	1303	55			
2	0	1655	40			
3	0	1240 1/2	90			
5	3	1329 1/2	3	>11.7	>11.7	off-scale
5	2	1839 1/2	2			
6	3	1436	1/2	>11.7	>11.7	off-scale
19	3	1614	3	>22.4	>22.4	off-scale
30	8	b1230	765	>11.7	>11.7	off-scale 1238-1317 UT

Flux in terms of KTB.

SOLAR RADIO WAVES (BOULDER) -- 460 MC

3-HOURLY AND DAILY FLUX

JUNE 1957

June 1957	Flux Hours UT 12-15	15-18	18-21	21-24	Flux Daily	Variability Hours UT 12-15	15-18	18-21	21-24	Variability Daily	Observed Periods Hours UT
1	81	70	75	70	73	0	0	0	1	1	1135-2605
2	81	79	67	79	76	0	2	0	1	2	1130-2605
3	98	76	70	73	78	3	0	0	0	3	1130-2605
4	84	74	70	75	75	(0)	0	0	0	(0)	1130-2605
5	80	71	69	72	72	2	0	0	0	2	1130-2605
6	--	75	--	75	75	0	0	0	2	2	1330-2605
7	--	68	--	79	72	0	0	(0)	0	(0)	1342-2605
8	76	73	64	68	70	0	1	0	(0)	1	1306-2610
9	80	79	72	71	75	0	0	0	0	0	1130-2610
10	79	67	64	66	69	0	0	0	(0)	(0)	1130-2610
11	--	55	60	67	60	0	0	0	0	0	1136-2610) See Note 1
12	74	54	53	55	58	0	0	0	0	0	1130-2610) See Note 1
13	--	57	55	63	59	0	(1)	(0)	(0)	(1)	1330-2615) See Note 1
14	--	57	58	64	61	0	0	0	1	1	1341-2615) See Note 1
15	83	--	74	75	77	(0)	1	0	2	2	1130-2615
16	93	65	64	72	72	0	0	0	0	0	1130-2615
17	79	68	67	84	74	0	0	0	0	0	1130-2615
18	75	73	73	103	82	1	0	0	1	1	1130-2615
19	155	151	146	88	133	0	3	0	2	3	1130-2615
20	99	95	101	136	109	0	0	0	2	2	1130-2615
21	87	82	84	94	87	1	1	0	(1)	(1)	1340-2615
22	95	102	86	112	99	0	0	0	1	1	1254-2615
23	128	119	98	89	107	0	0	1	0	1	1130-2615
24	108	95	88	101	97	0	0	0	1	1	1130-2045; 2250-2615
25	--	73	70	81	76	0	2	0	1	2	1130-2620
26	113	108	91	--	105	1	1	(0)	0	1	1130-2000; 2400-2620
27	102	90	83	92	92	0	0	(0)	1	1	1130-2620
28	84	66	64	70	70	2	0	1	2	2	1130-2620
29	85	73	71	76	75	1	1	1	1	1	1130-2620
30	92	68	62	69	71	2	0	2	2	2	1130-2620

Notes: 1. The daily flux medians for June 11, 12, 13, and 14, 1957, are about 15% lower than any values observed since March, 1957. No reason is now known.

2. Operation of 167 Mc/s radiometer resumed July 1, 1957. No observations from April 16 through June 30, 1957, because of mechanical failure.

SOLAR RADIO WAVES (BOULDER) -- 460 MC

OUTSTANDING EVENTS

JUNE 1957

June 1957	Type	Start UT	Duration Hrs:Mins	Maximum Time UT	Maximum Inst. Flux	Maximum Smd. Flux	Remarks
1	3	1255.3	00:03.5	1255.5	180	60	
1	3	2425.3	00:00.2	2425.3	190	--	
2	9	1522.0	00:26	1529.1	300	45	
2	3	1619.6	00:01.3	1620.8	810	--	
2	6	2200	(04:05)	2501.7	600	23	
3	9	1151	01:39	1209.1	>2600	1300	
3	3	1448.4	00:00.2	1448.5	1400	--	
3	3	1456.1	00:00.6	1456.3	470	--	
5	8	1328.1	(00:01.9)	1329.8	>3100	760	
6	8	2213.3	00:06	2219.7	>1900	84	
8	3	1642.6	00:00.3	1642.8	570	--	
13	2	1510.3	00:04.6	1512.1	200	44	
14	2	(2339)	(00:01.1)	~2339	~150	--	
15	3	1659.9	00:02.9	1700.0	190	--	
15	8	2342.5	00:01.1	2343.6	1300	--	
16	6	1216.9	04:43	1318.6	180	35	
16	2	2502.7	00:01.0	2503.2	170	--	
17	3	2148.9	00:00.4	2149.1	160	--	
18	3	1326.7	00:01.2	1327.8	210	--	
18	6	2230	(03:45)	2317.5	350	60	
19	6	(1130)	(14:45)	Note 2	--	100	
19	8	1609.4	00:04.2	1609.4	>2600	250	
20	6	(1130)	(14:45)	~2500	--	78	
20	3	2404.4	00:01.5	2404.8	1100	--	
21	6	(1340)	(12:35)	~1730	--	36	

Notes: 1. Relatively small events not reported.

2. June 19, 1957 most active period from 1600-1900.

SOLAR RADIO WAVES (BOULDER) -- 460 MC

OUTSTANDING EVENTS

JUNE 1957

June 1957	Type	Start UT	Duration Hrs:Mins	Maximum Time UT	Maximum Inst. Flux	Maximum Smd. Flux	Remarks
21	3	1349.5	00:00.9	1350.0	370	--	
21	3	2221.7	00:00.6	2222.1	740	--	
22	6	(1254)	(13:21)	~1730	--	54	
22	3	2121.7	00:01.2	~2122.5	220	--	
23	6	(1130)	(14:45)	~1230	--	70	
23	3	2011.2	00:00.6	2011.7	620	--	
24	6	(1130)	(14:45)	2329.7	450	46	
25	6	(1130)	(14:50)	~2400	--	24	
25	3	1355.3	00:00.6	1355.8	2100	--	
25	3	2440.6	00:00.3	2440.9	470	--	
26	6	(1130)	(14:50)	1302.4	240	55	
27	6	(1130)	(12:16)	~1430	--	39	
27	9	2346	(02:34)	2357.1	610	37	
28	9	1222	01:23	1228.9	1200	100	Note 3
28	1	1600	04:30	2025.1	200	--	
28	3	2420.7	00:01.8	2421.5	700	--	
28	2	2506.8	00:02.6	2506.9	560	--	
29	6	(1130)	(14:55)	~1500	--	26	
29	2	1225.9	00:07	1227.5	280	29	
29	3	1512.0	00:00.8	1512.1	370	--	
30	9	(1130)	(02:00)	1135.1	600	100	Note 4
30	1	1330	(12:50)	2356.4	300	--	
30	3	2017.0	00:01.0	2018.1	630	--	
30	2	2202.3	00:02.2	2202.7	660	190	

Notes: 3. Two other peaks at 1258.0 and 1310.0 June 28, 1957.

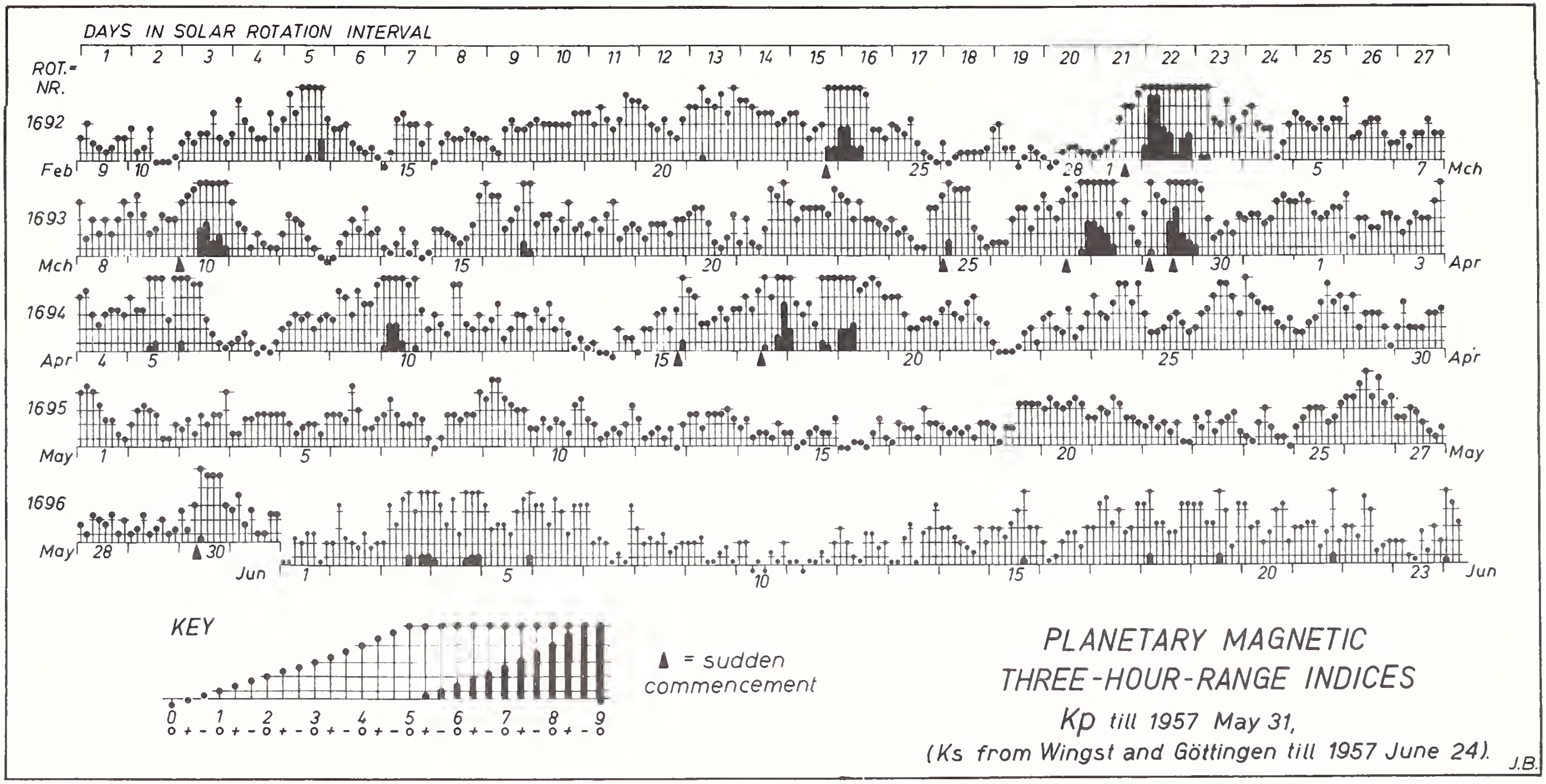
4. Other high peaks at 1222.5 and 1243.1 June 30, 1957.

5. Operation of 167 Mc/s radiometer resumed July 1, 1957. No observations from April 16 through June 30, 1957 because of mechanical failure.

GEOMAGNETIC ACTIVITY INDICES

MAY 1957

May 1957	C	Values Kp Three hour Gr. interval 1	2	3	4	5	6	7	8	Sum	Ap	Final Selected Days
1	0.7	4o	4+	4o	3+	2+	2+	1+	1o	23-	16	Five
2	0.4	2o	3o	3+	3o	3-	1o	1o	2o	18o	10	Quiet
3	0.7	2-	2+	1+	3-	2o	3-	3-	4o	19+	11	
4	0.5	1+	1+	2+	2+	3-	3-	3-	3-	18o	10	12
5	0.4	3-	2o	1+	2-	2o	2o	1+	3-	16-	8	15
												16
6	0.8	3-	3-	2+	4+	3o	2-	2-	2+	21-	13	24
7	0.7	3-	4-	3-	2o	2o	3-	2+	1o	19o	11	29
8	0.9	0+	1o	3-	3-	2+	3-	3-	4o	18+	11	
9	1.0	4-	5-	5-	4-	3+	3o	3o	2-	28-	22	
10	0.6	2-	2+	2-	2+	2o	1+	3+	4-	18+	10	
11	0.6	2+	2o	1o	1+	2-	1+	2o	3+	15o	8	Five
12	0.2	2+	1o	1+	2-	1o	2-	0+	2o	11+	5	Disturbed
13	0.6	3-	3-	2-	3-	3-	3-	3o	2+	20+	11	
14	0.3	2-	2+	1o	1+	1+	1o	2o	1+	12o	6	1
15	0.2	1+	0+	1-	1+	2-	1+	1+	2+	10+	5	9
												20
16	0.2	0+	0+	1-	1-	0+	1+	2+	1o	7o	4	26
17	0.4	1-	2o	2-	2-	1o	3o	2o	2o	14o	7	30
18	0.2	2-	1+	2-	1+	2-	1o	2o	2o	13-	6	
19	0.6	2-	1-	2-	2-	3+	3+	3+	3+	19o	12	
20	0.9	3o	4-	3+	3o	3+	4-	3+	2+	26-	17	
21	0.8	2+	3o	3-	4-	3+	2+	2+	2o	22-	13	Ten
22	0.4	2-	2+	2-	2o	1+	2o	1-	1-	12+	6	Quiet
23	0.4	2+	2-	3-	1+	2o	2+	3-	1+	16+	8	
24	0.2	1o	1-	2o	3o	2-	1o	1o	0+	11-	6	12
25	0.8	2-	2+	3o	3o	3o	2o	2+	3+	21-	12	14
												15
26	1.2	4-	4-	4+	5o	4-	5-	3+	4-	32o	28	16
27	0.4	2+	2+	3o	3-	2o	1+	1o	2-	16+	8	17
28	0.4	2-	1o	2+	2o	2-	2+	1o	2o	14o	6	18
29	0.2	1o	1+	2+	1o	1+	2o	1o	1+	11+	5	22
30	1.3	3-	1+	3o	5+	5-	5-	5-	3o	29+	28	24
31	0.5	3-	4-	2-	3-	1o	1o	2+	2+	17+	10	28
												29
Mean:	0.56									Mean:	11	


DAYS IN SOLAR ROTATION INTERVAL
ROT.= NR.
1692
1693
1694
1695
1696
Feb
Mch
Apr
May
Jun
KEY
▲ = sudden commencement
PLANETARY MAGNETIC
THREE-HOUR-RANGE INDICES
Kp till 1957 May 31,
(Ks from Wingst and Göttingen till 1957 June 24).
J.B.

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH ATLANTIC

MAY 1957

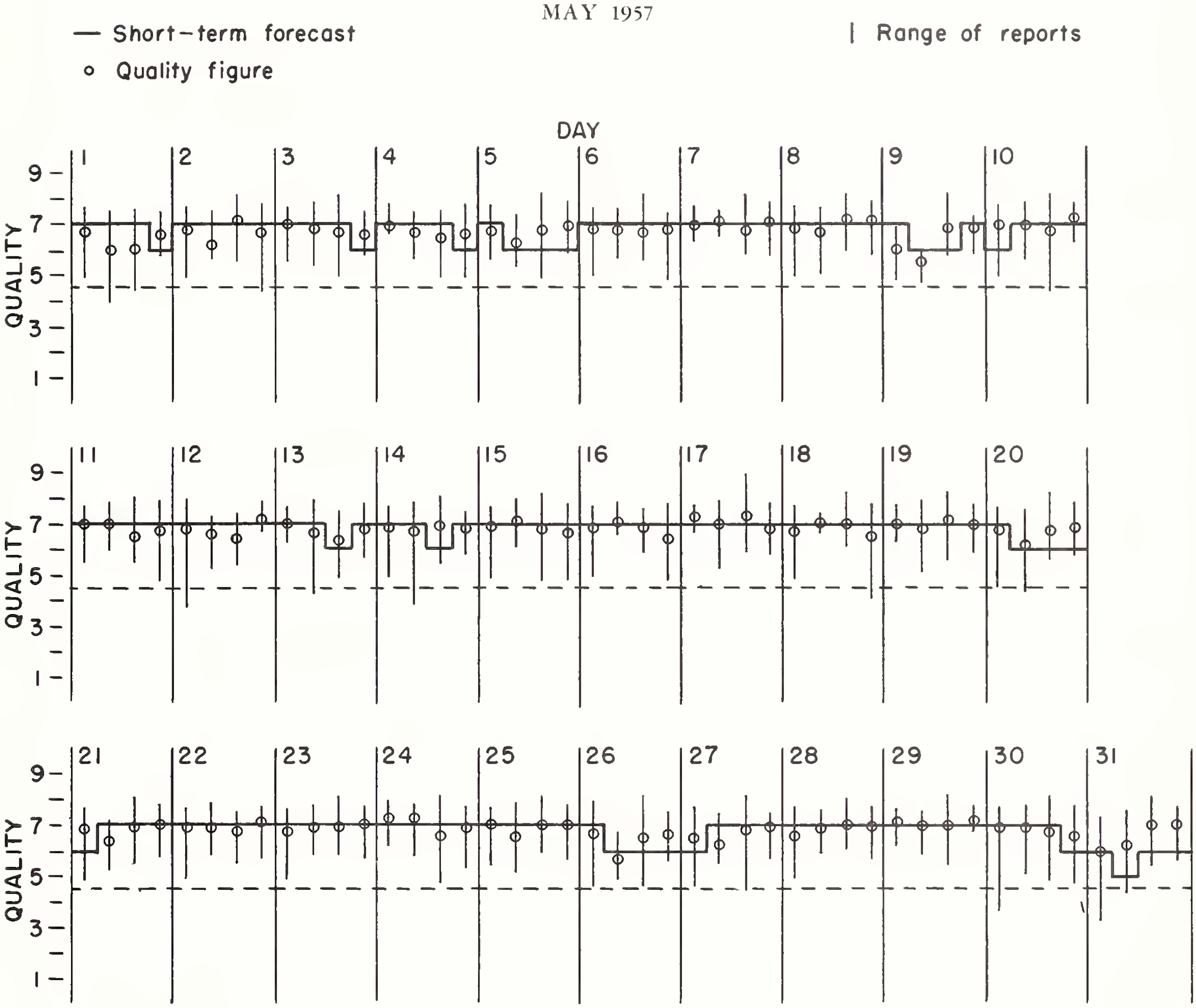
May 1957	North Atlantic 6-hourly quality figures				Short-term forecasts issued about one hour in advance of:				Whole day index	Advance forecasts (J-reports) for whole day; issued in advance by:			Geomagnetic K_{Fr}	
	00 to 06	06 to 12	12 to 18	18 to 24	00	06	12	18		1-4 days	4-7 days	8-25 days	Half (1)	Day (2)
1	7-	6o	6o	7-	7	7	7	6	6+	7	7		(4)	2
2	7-	6+	7o	7-	7	7	7	7	7-	7	7		3	2
3	7o	7-	7-	7-	7	7	7	6	7-	7	7		2	3
4	7o	7-	7-	7-	7	7	7	6	7-	7	7		2	3
5	7-	6+	7-	7o	7	6	6	6	7-	7	7		2	2
6	7-	7-	7-	7-	7	7	7	7	7-	7	7		3	2
7	7o	7o	7-	7o	7	7	7	7	7o	7	7		3	2
8	7-	7-	7o	7o	7	7	7	7	7o	7	7		2	3
9	6o	5+	7-	7o	7	6	6	7	6+	7	7		3	3
10	7o	7o	7-	7+	6	7	7	7	7o	6	7		2	3
11	7o	7o	7-	7-	7	7	7	7	7-	6	7		2	2
12	7o	7-	6+	7+	7	7	7	7	7-	6	7		1	2
13	7o	7-	6+	7-	7	7	6	7	7-	6	7		2	2
14	7o	7-	7o	7-	7	7	6	7	7-	7	7		2	2
15	7o	7o	7-	7-	7	7	7	7	7o	7	7		1	2
16	7-	7o	7-	6+	7	7	7	7	7-	7	7		1	1
17	7+	7o	7+	7o	7	7	7	7	7o	7	7		2	2
18	7-	7o	7o	7-	7	7	7	7	7-	6	7		2	2
19	7o	7-	7o	7o	7	7	7	7	7o	5	5		1	3
20	7-	6+	7-	7-	7	6	6	6	7-	5	5		(4)	3
21	7o	6+	7o	7o	6	7	7	7	7-	7	6		3	2
22	7o	7o	7-	7o	7	7	7	7	7o	7	6		2	2
23	7-	7o	7o	7o	7	7	7	7	7o	7	6		2	2
24	7+	7+	7-	7o	7	7	7	7	7o	7	7		2	2
25	7o	7-	7o	7o	7	7	7	7	7o	7	7		3	3
26	7-	6-	7-	7-	7	6	6	6	6+	7	7		(4)	(4)
27	7-	6+	7-	7o	6	7	7	7	7-	7	7		3	2
28	7-	7-	7o	7o	7	7	7	7	7-	7	7		2	2
29	7o	7o	7o	7+	7	7	7	7	7o	7	7		2	2
30	7o	7o	7-	7-	7	7	7	6	7-	7	7		3	(4)
31	6o	6+	7o	7o	6	5	6	6	7-	5	7		3	2

Score:		00	06	12	18	1-4 days	4-7 days
Quiet Periods	P	27	25	23	22	20	23
	S	4	6	8	9	8	6
	U	0	0	0	0	3	2
	F	0	0	0	0	0	0
Disturbed Periods	P	0	0	0	0	0	0
	S	0	0	0	0	0	0
	U	0	0	0	0	0	0
	F	0	0	0	0	0	0

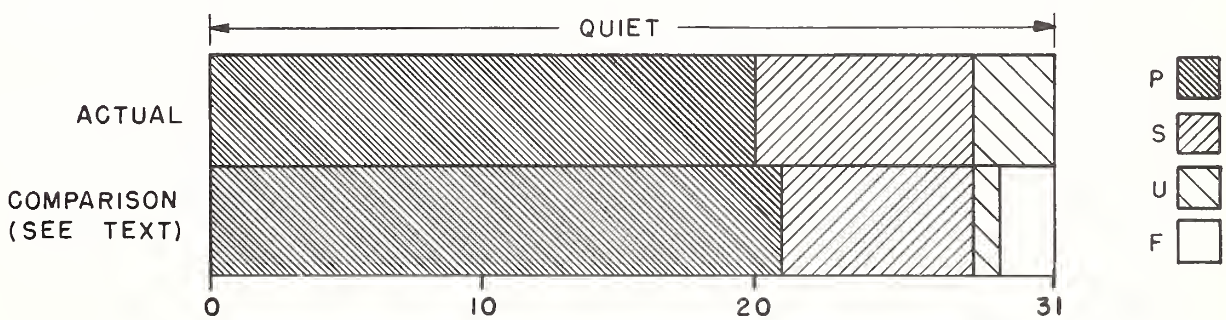
( ) represent disturbed values.

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS
NORTH ATLANTIC

MAY 1957

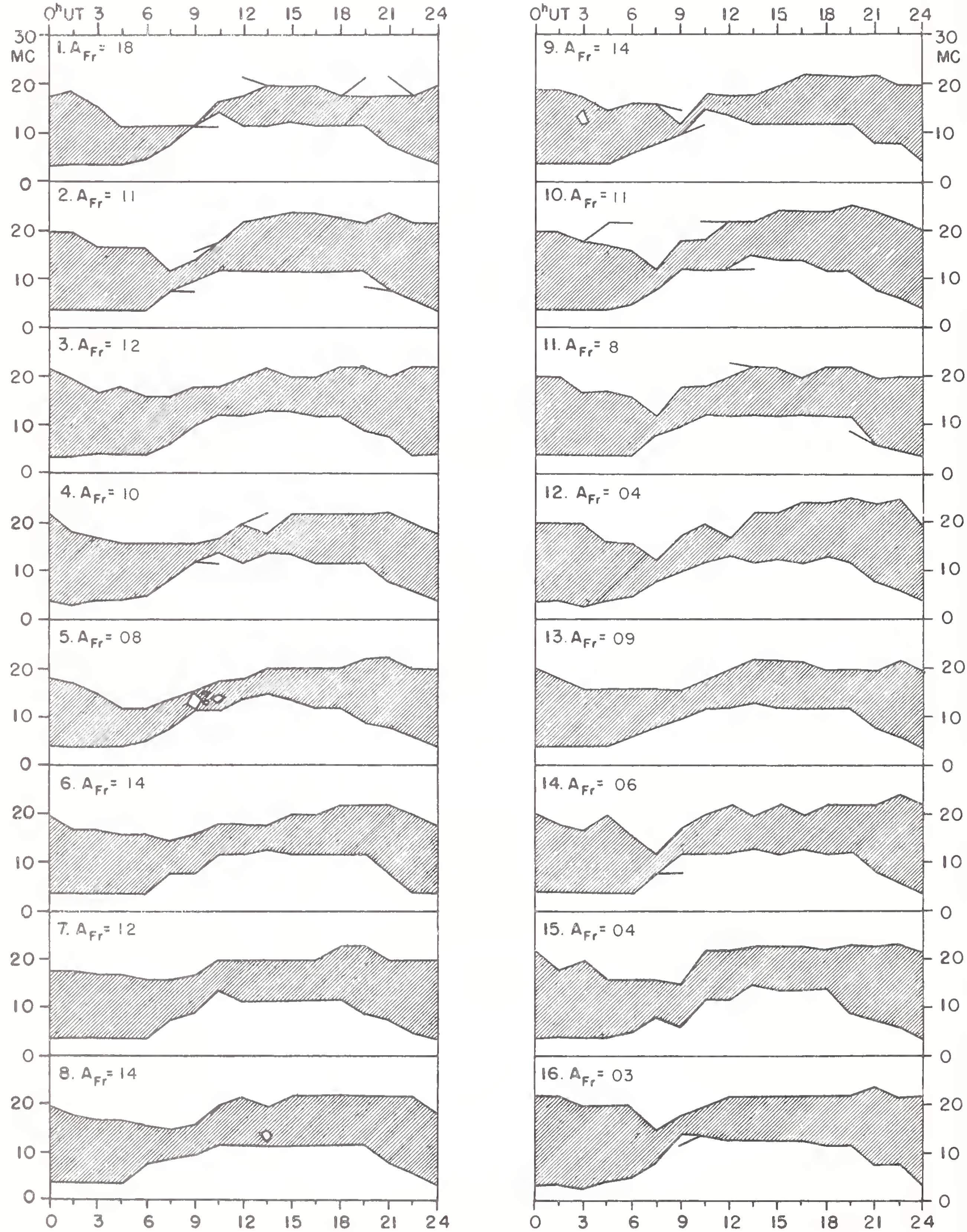


OUTCOME OF ADVANCE FORECASTS (1 TO 4 DAYS AHEAD)

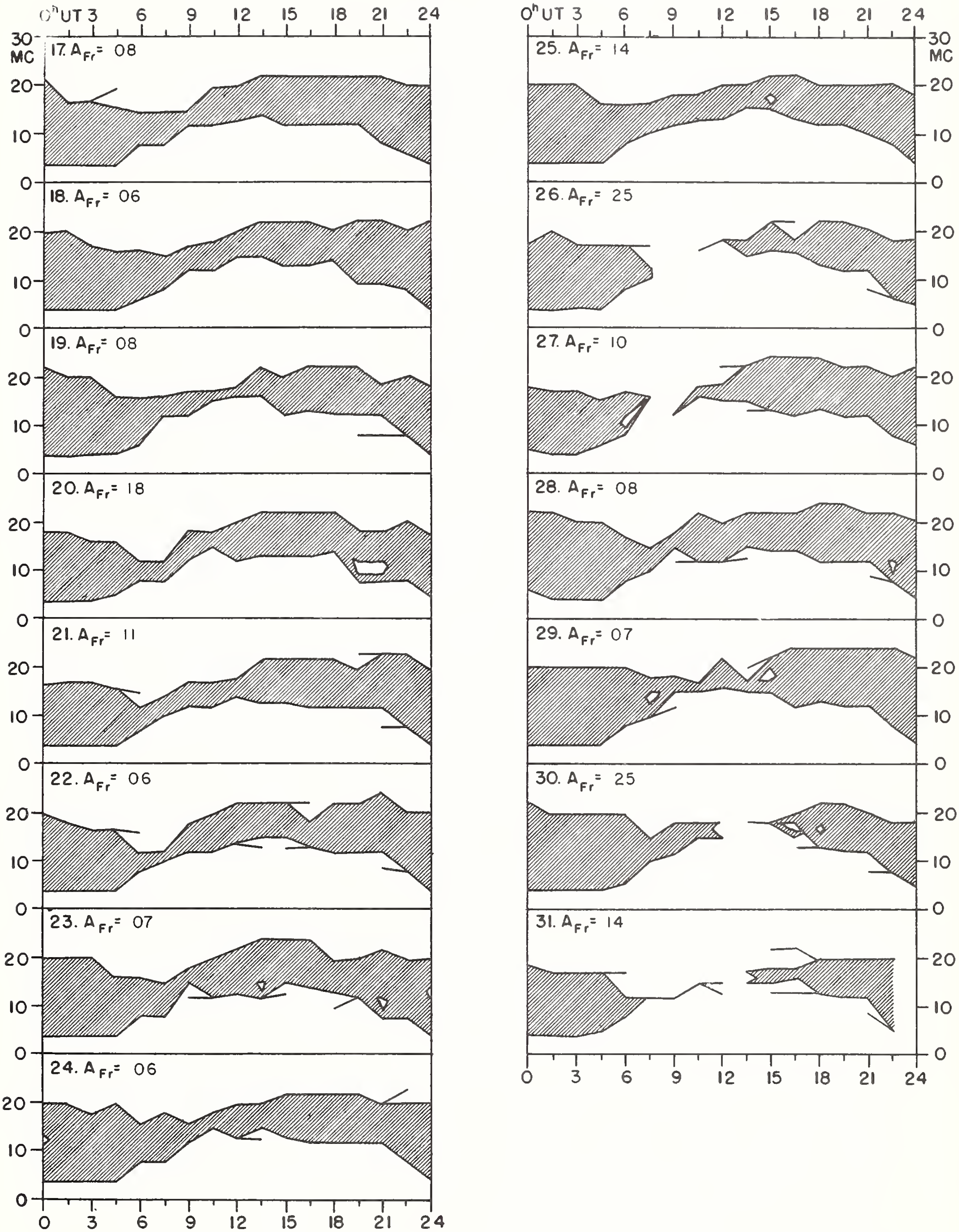


USEFUL FREQUENCY RANGES -- NORTH ATLANTIC PATH

MAY 1957



MAY 1957



Adapted from Observations by Deutsches Bundespost

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH PACIFIC

MAY 1957

May 1957	North Pacific 8-hourly quality figures			Short-term forecasts issued at			Whole day index	Advance forecasts (Jp reports) for whole day; issued in advance by:			Geomagnetic K_{Si}	
	03 to 11	11 to 19	19 to 03	02	10	18		1-4 days	4-7 days	8-25 days	Half day (1)	Half day (2)
1	6	7	7	7	6	7	7	7	5		(4)	2
2	7	7	6	7	7	7	7	7	6		3	2
3	7	7	6	6	6	7	7	7	6		3	3
4	7	7	6	6	6	6	7	7	7		3	3
5	6	6	6	7	7	6	6	7	7		2	2
6	6	6	6	6	6	6	6	6	6		3	2
7	6	7	7	7	7	7	7	6	6		3	2
8	6	7	7	6	7	7	7	6	6		3	2
9	6	7	7	7	6	7	7	5	7		(6)	3
10	6	6	7	6	7	7	6	5	7		3	2
11	6	7	6	7	7	7	6	7	6		2	2
12	6	6	6	7	7	7	6	7	6		2	1
13	7	7	6	7	7	6	7	6	6		3	3
14	7	7	7	7	7	7	7	6	6		1	1
15	7	6	6	7	7	7	7	7	6		1	1
16	7	7	7	7	7	7	7	7	6		1	1
17	7	7	7	7	7	7	7	7	6		1	1
18	7	6	7	6	7	7	7	7	6		2	1
19	6	7	7	7	7	7	7	6	5		1	3
20	7	7	6	6	6	7	7	4	5		(4)	(4)
21	6	6	6	6	6	6	6	4	6		2	2
22	7	6	6	6	7	7	7	6	6		2	1
23	6	7	7	6	6	7	7	6	6		2	2
24	6	6	6	6	6	7	7	6	7		3	2
25	6	7	7	7	7	7	7	6	6		3	3
26	6	5	5	7	5	6	6	6	6		(4)	(5)
27	6	7	6	5	6	7	6	6	6		3	2
28	6	7	6	7	7	7	6	7	6		3	1
29	6	6	6	7	7	7	6	7	7		2	1
30	6	6	6	7	6	5	6	7	7		3	(4)
31	6	6	6	5	6	7	6	7	7		3	2
Score:	Quiet Periods		P	12	17	17		11	8			
			S	19	14	14		17	20			
			U	0	0	0		1	3			
			F	0	0	0		2	0			
	Disturbed Periods		P	0	0	0		0	0			
			S	0	0	0		0	0			
			U	0	0	0		0	0			
			F	0	0	0		0	0			

( ) represent disturbed values.

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH PACIFIC

MAY 1957