PART B

SOLAR - GEOPHYSICAL DATA

ISSUED
JUNE 1957

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

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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 (x 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:

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

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.

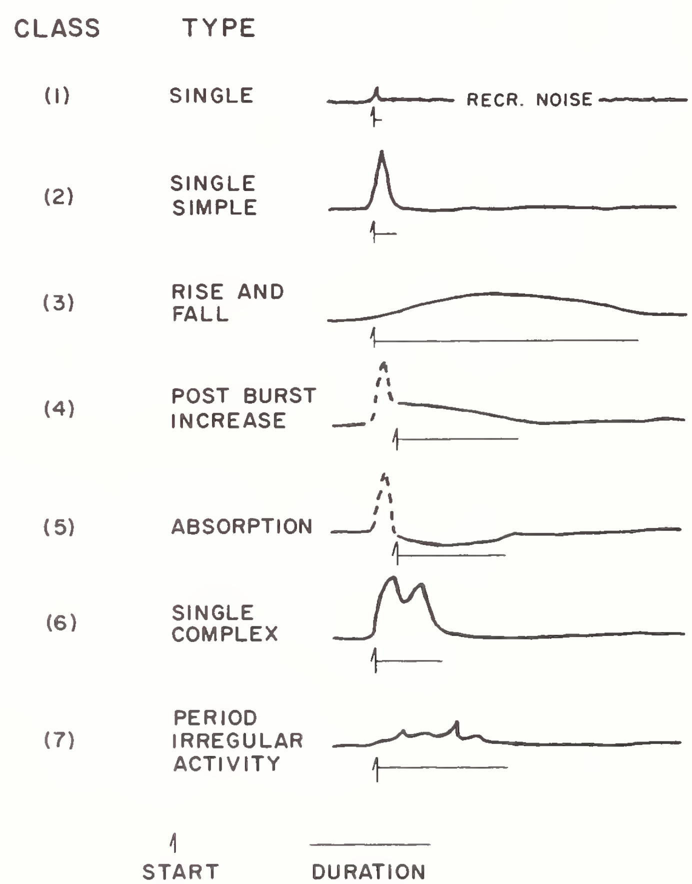
3 - Rise and fall -- A distinct, but less sudden, increase in flux than the usual burst. It may last from tens of minutes to several hours. These events range from large distinct features on the records to tiny bursts, only a few times receiver noise.

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.

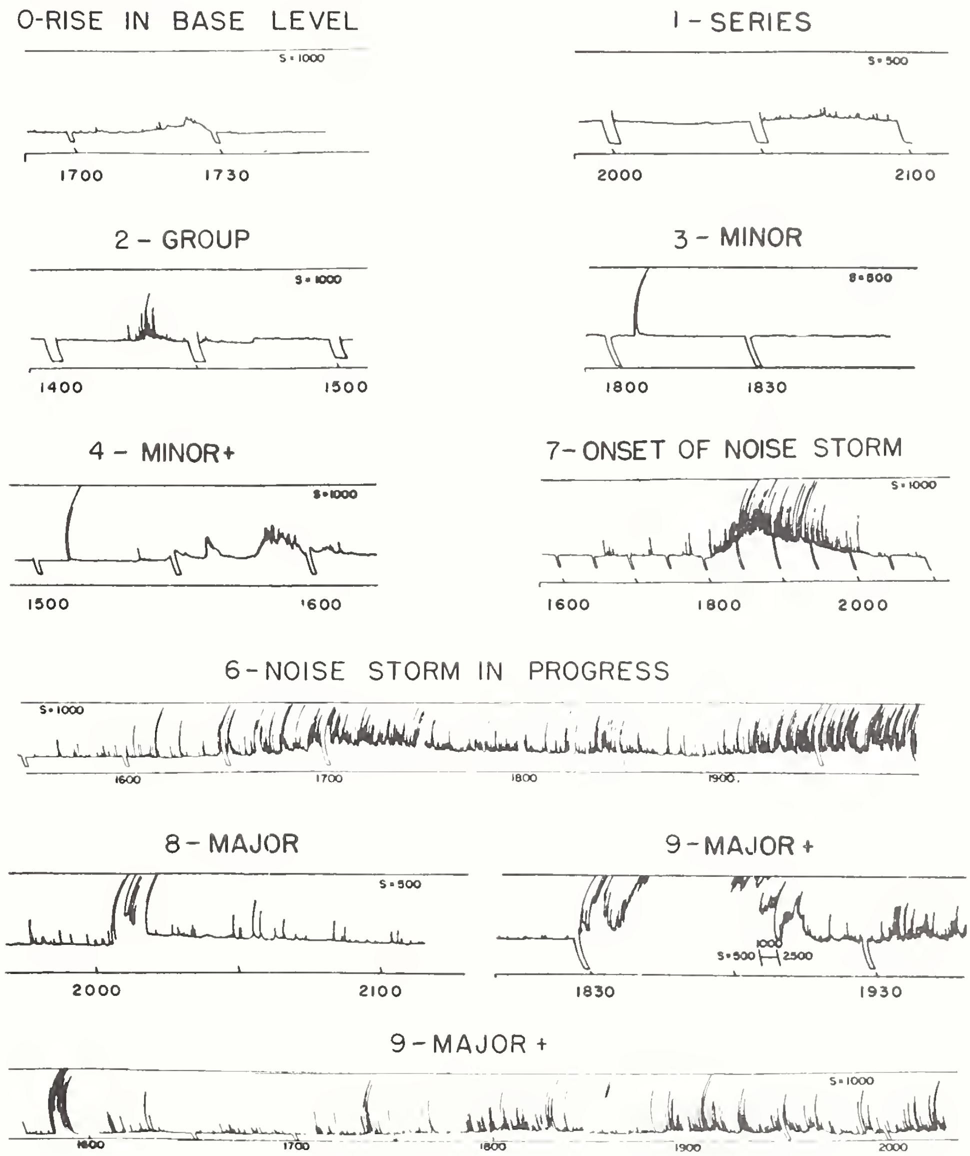
4 - Minor burst and second part -- A double rise in flux in which the early rise is a minor burst.

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 - Major burst and second part -- 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.

<u>Note</u>: 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.

<u>North Pacific Radio Path</u> -- 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.

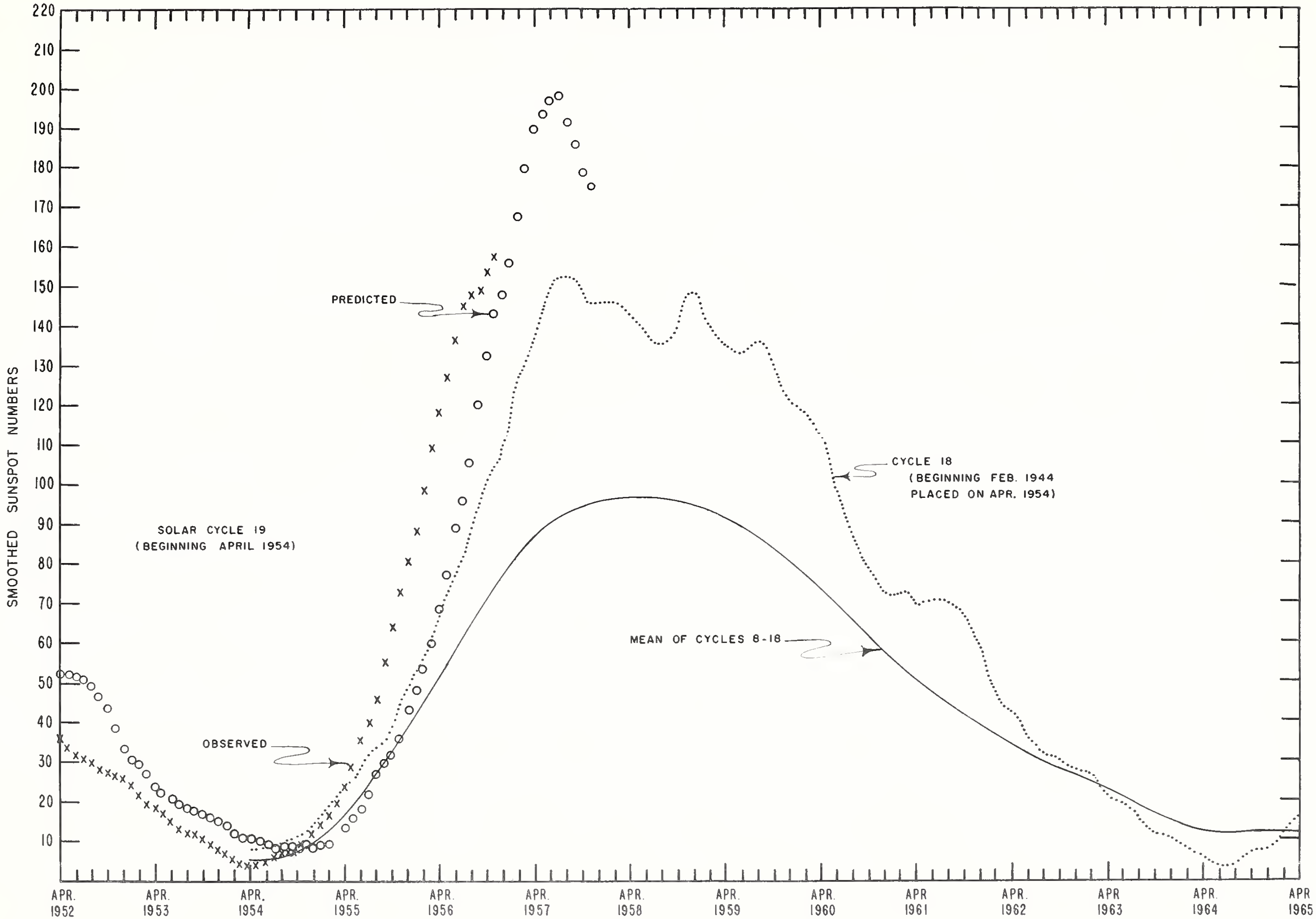
The chart compares the outcome of advance forecasts, on the same basis as the similar chart for the North Atlantic Radio Path.

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

Apr. 1957 Date	American Relative Sunspot Numbers R_A'
1	113
2	127
3	132
4	132
5	150
6	136
7	137
8	164
9	160
10	143
11	117
12	117
13	97
14	93
15	124
16	190
17	187
18	193
19	180
20	198
21	188
22	195
23	226
24	229
25	209
26	183
27	198
28	188
29	180
30	151
Mean:	161.2

May 1957 Date	Zurich Provisional Relative Sunspot Numbers R_Z	Daily Values Solar Flux at 2800 Mc, Ottawa, Canada Flux
1	118	175
2	121	176
3	123	182
4	106	190
5	92	202
6	142	198
7	136	204
8	150	207
9	162	228
10	195	227
11	211	234
12	207	228
13	202	242
14	214	248
15	210	235
16	185	239
17	179	212
18	186	214
19	178	201
20	179	---
21	195	230
22	155	212
23	184	207
24	195	210
25	150	196
26	140	184
27	140	198
28	147	181
29	154	183
30	172	199
31	180	211
Mean:	164.8	208.4



PREDICTED AND OBSERVED SUNSPOT NUMBERS

SOLAR FLARES

MAY 1957

Observatory	Date May 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
S.Peak	02	1350	1420	30	122	3960	N25	E08	1355	15	3	1	
Mitaka	03	b0631	0642	>11		3969	S26	E11				1	
Capri-S	03	b1316	a1317	>01	102	3964	S20	E30				1	
McMath	03	b1350				3969	S25	W00				1	Slow S-SWF
Neder.	03	b1350				3969	S24	E03				1	
S.Peak	03	1705	1720	15	110	3953	S18	W72	1712	20	8	1	Slow S-SWF
S.Peak	03	1920	2045	85	130	3969	S25	W00	1950	18	3	1	G-SWF
S.Peak	03	2045	a2125	>40	110	3969	S25	W01	2102	13	4	1	S-SWF
Honolulu	05	b€145	1063	>18		3974	N32	E80				2	S-SWF
S.Peak	05	1432	1455	23	41	3969	S25	W25	1435	17	5	1-	Slow S-SWF
Capri-S	05	1434	a1444	>10	107	3969	S24	W24				1	
Capri-S	06	b0924	a0924		121	3971	S17	E43				1	
Capri-S	06	b1020	a1028	>08	121	3971	S17	E43				1	
Capri-S	06	1143	1158	15	136	3972	S32	E65				1	S-SWF
Honolulu	06	b2016	2035	>19		3974	N29	E60	2018			1+	G-SWF
Honolulu	06	b2226	2238	>12		3974	N29	E60	2230			1	
Honolulu	06	b2345	2421	>36		3971	S19	E45	2353			2	Slow S-SWF
Capri-S	07	b0646	a0737	>51	204	3972	S26	E38				1+	
Capri-S	07	0842	a0858	>16	107	3972	S26	E37				1	
Capri-S	07	0853	0937	44	233	3974	N13	E45				1+	
Arcetri	07	b0907	0914	>07		3974	N12	E45				1+	
Capri-S	07	1016	1258	162	437	3972	S26	E41				2+	
Capri-S	08	b0500	a0523	>23	136	3972	S24	E41				1	S-SWF
Capri-S	08	0515	0548	33	121	3974	N15	E46				1	
Capri-S	08	b0712	0901	>109	219	3974	N15	E45				1+	
Capri-S	08	0857	a0921	>24	97	3972	S32	E28				1	
S.Peak	08	2317	2350	33	155	3974	N14	E32	2327	20	2	1+	
Honolulu	08	2316	2342	16		3974	N21	E25	2328			2+	Slow S-SWF
Mitaka	08	b2317	a2354	>37	275	3974	N10	E29	2329			1+	
Mitaka	09	b0441	a0528	>47		3974	N15	E37	0506			1+	S-SWF
Capri-S	09	0846	a0910	>24	112	3972	S27	E23				1	
Capri-S	09	b0911	0931	>20	136	3973	S22	E21				1	
Capri-S	09	1147	1203	16	97	3974	N13	E25				1	
Honolulu	09	1940	1948	08		3973	S21	E29	1942			1	
S.Peak	09	2230	2243	13	50	3972	S29	E21	2235	15	4	1-	
Mitaka	09	b2231	a2244	>13		3972	S28	E20				1	
Honolulu	10	0008	0034	26		3972	S22	E15	0022			1	S-SWF
Mitaka	10	b0011	0031	>20		3972	S25	E07	0013			1	
Mitaka	10	b0526	0538	>12		3972	S25	E08	0530			1	S-SWF
Mitaka	10	0702	0711	09		3972	S31	E18	0704			1+	G-SWF
Neder.	10	1016	1048	32		3969	S25	W90				1	
Simeiz	11	b1103				3972	S25	W04	1103			1	
Simeiz	11	b1116				3973	S18	W25	1116			1	
Simeiz	11	b1121				3972	S28	E10	1121			1	
Schaus.	11	b1235	1250	>15		3967	S19	W31				2+	
Simeiz	11	b1236				3971	S17	W21	1236			2	
Capri-S	11	1229	a1319	>50	170	3967	S18	W33				1+	
Capri-S	11	b1516	a1528	>12	141	3972	S29	E01				1	
Schaus.	12	b0738	0805	>27		----	S12	W11				1	Slow S-SWF
Ottawa	12	1202	1337	95		3974	N13	W12				2	
Simeiz	12	b1204				3974	N11	W14	1204			1	Slow S-SWF
Capri-S	12	1205	a1324	>79	112	3974	N13	W11				1	

SOLAR FLARES

MAY 1957

Observatory	Date May 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. Ionoshperic Effect
Simeiz	12	b1215				3967	S20	W48	1215			1	
S.Peak	12	~1715	1800	~45	105	3974	N13	W16	1735	23	5	1	S-SWF
Mitaka	12	b2300	2327	>27	330	3979	S22	E62	2308			1+	
Mitaka	13	0020	0030	10	135	3974	N12	W22				1	
Mitaka	13	0218	0250	32	180	3974	N12	W18				1	S-SWF
Mitaka	13	0341	0410	29		3974	N13	W17				1	S-SWF
S.Peak	13	b1305	1400	>55	130	3974	N13	W28	1323	26	3	1	Slow S-SWF
Capri-S	13	b1318	a1337	>19	160	3974	N13	W24				1+	
Capri-S	13	1516	1537	21	102	3974	N13	W24				1	S-SWF
Mitaka	13	2351	2405	14	180	3972	S29	W35	2355			1	
Wendel.	14	0840	0910	30		3980	S24	E77				1	
Capri-S	14	0845	0859	14	165	3980	S22	E83				1	
Capri-S	14	1045	1056	11	107	3974	N12	W35				1	S-SWF
Capri-S	14	1310	1500	110	462	3967	S17	W73				2	G-SWF
S.Peak	14	1315	1425	70	134	3967	S19	W73	1343	18	5	1	
Capri-S	14	1418	1500	42	272	3980	S20	E69				2	
S.Peak	14	1418	1428	10	69	3980	S22	E75	1420	17	6	1-	S-SWF
Schaus.	14	b1420	1455	>35		3980	S20	E74				1+	
S.Peak	14	1423	1438	15	62	3979	S11	E33	1428	20	7	1-	
Capri-S	14	b1426	1441	>15	92	3979	S11	E33				1	S-SWF
S.Peak	14	1840	1850	10	127	3974	N09	W50	1843	20	5	1	S-SWF
Honolulu	14	b2002	2052	>50		3974	N12	W44	2002			1+	S-SWF
Honolulu	15	0150	0158	08		3974	N15	W50	0152			1	
Capri-S	15	0738	a0807	>29	87	3979	S11	E23				1-	
Mitaka	15	b0748	a0758	>10	135	3979	S11	E25				1	
S.Peak	15	1234	1300	26	76	3979	S12	E20	1238	19	8	1-	G-SWF
Capri-S	15	1235	1301	26	121	3979	S12	E22				1	
S.Peak	15	1405	1418	13	48	3979	S11	E15	1410	25	7	1-	
Capri-S	15	1407	a1415	>08	34	3979	S09	E15				1-	
McMath	15	b1408	a1420	>12		3979	S11	E18				1+	S-SWF
S.Peak	15	1815	1833	18	110	3982	S16	W44	1823	15	8	1	Slow S-SWF
Mitaka	15	b2208	2323	>75	180	3982	S18	W44				1+	G-SWF
Mitaka	15	2320	2333	13		3974	N12	W60				1	S-SWF
Mitaka	16	0003	0014	11		3979	S11	E10				1	
Mitaka	16	0101	0119	18		3974	N11	W56				1	
Mitaka	16	b0350	0417	>27		3980	S26	E60				1	Slow S-SWF
Capri-S	16	b0907	a0908	>01	175	3980	S24	E51				1+	S-SWF
Ottawa	16	1242	1304	22		3979	S11	E07	1245			1+	S-SWF
Capri-S	16	b1245	a1315	>30	146	3979	S12	E10				1+	
Mitaka	16	b2221	a2246	>25	184	3982	S15	W58	2235			1	
S.Peak	16	2325	2340	15	120	3982	S16	W60	2330	16	9	1	
Mitaka	17	b0046	a0129	>43	221	3982	S15	W58	0051			1	S-SWF
Honolulu	17	0048	0120	32		3984	S15	E60				1	S-SWF
S.Peak	17	~1557	a1610	>13	130	3979	S11	W05	1605	20	7	1	
Mt.Wilson	17	b1601	1611	>10		3979	S15	W05				1	
Mt.Wilson	17	b1726	1746	>20		3982	S15	W55				1	
S.Peak	17	2207	a2315	>68	110	3972	S35	W90	2252	18	8	1	
Capri-S	18	0719	0736	17	112	3983	N07	E34				1	
Schaus.	18	b0810	0827	>17		3979	S12	W15				1+	S-SWF
Capri-S	18	0810	a0939	>89	151	3979	S10	W14				1+	

SOLAR FLARES

MAY 1957

Observatory	Date May 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
Schaus.	18	b0902	0950	>48		3979	S13	W14				1	
Capri-S	18	b1010	a1034	>24	267	3988	S16	E76				1	
Schaus.	18	b1015	1017	>02		3988	S22	E75				1	
S.Peak	19	b1249	1310	>21	172	3980	S29	E15				1	
Neder.	20	b0840	0935	>55		3990	S12	E80				1	
Honolulu	20	2142	2216	34		3980	S11	W07	2150			2	
Honolulu	20	2334	2346	12		3983	N10	W01	2336			1	
Mitaka	21	0109	0120	11	89	3990	S10	E71	0111			1	
Honolulu	21	0204	0228	24		3980	S22	W08	0208			2	Slow S-SWF
Mitaka	21	b0212	0227	>15		3980	S23	W12	0218			1+	
Ottawa	21	b1208	1229	>21		3987	N15	E44	1220			1	Slow S-SWF
S.Peak	21	b1245	1300	>15	110	3987	N13	E46	1255	14	8	1	
Honolulu	21	1856	1938	42		3990	S11	E60	1908			1	Slow S-SWF
S.Peak	21	1900	1935	35	159	3990	S12	E63	1908	18	9	1	
Honolulu	21	2252	a2304	>12		3987	N18	E38	2304			1+	
Honolulu	22	0008	0022	14		3980	S20	W22	0012			1	
Honolulu	22	1830	a1834	>04			S07	E21	1834			1	
S.Peak	22	1830	1845	15	93		S12	E21	1833	16	2	1-	
Capri-S	23	b1244	1302	>18	112		S12	E09				1	
S.Peak	23	b1246	1305	>19	55		S12	E08	1250	16	9	1-	
Capri-S	23	b1355	1416	>21	97	3990	S13	E40				1	
S.Peak	23	b1355	1408	>13	48	3990	S15	E39	1355	20	9	1-	
S.Peak	23	1800	1815	15	121	3976	N28	W90	1803	17	9	1	G-SWF
McMath	24	b1418				3990	S10	E25				1	G-SWF
Capri-S	24	1424	a1443	>19	107	3990	S11	E23				1	
S.Peak	24	b1617	1637	>20	125	3993	N10	W53	~1618	28	2	1+	S-SWF
McMath	24	b1620	1645	>25		3993	N10	W50				1+	
Kiev.	25	b1438				3980	S20	W70				2	S-SWF
S.Peak	25	1440	1500	20	40	3980	S20	W89	1442	22	6	1-	
McMath	25	1450				3980	S20	W90				1	
S.Peak	25	1540	1655	75	190	3983	N10	W65	1552	22	1	1	S-SWF
S.Peak	26	2040	2135	55		3988	S17	W15	2048	18	8	1+	
Mitaka	27	b2307	a2344	>37	147	3988	S16	W17				1	
Mitaka	27	b2329	2335	>06		3984	S13	W63				1	
Capri-S	29	0658	0706	08	121	3997	S17	E84				1	
Capri-S	29	b1046	a1100	>14	185	3997	S15	E82				1	
Honolulu	30	0240	a0246	>06			S26	W30	0246			1	
S.Peak	30	1250	1305	15	49	3987	N26	W71	1252	16	3	1-	S-SWF
Capri-S	30	b1251	a1302	>11	185	3987	N26	W68				1	
S.Peak	30	1620	1630	10	118	3987	N26	W76	1623			1	S-SWF
Capri-S	31	b0810	a0819	>09	107	3987	N26	W80				1	Slow S-SWF
Capri-S	31	0910	a0920	>10	49	3987	N25	W90				1	
S.Peak	31	1258	1318	20	145	3987	N25	W82	1305	20	9	1	
Neder.	31	1300	1340	40		3987	N27	W85				1	Slow S-SWF
McMath	31	b1320				3987	N23	W90				1	
S.Peak	31	1558	1613	15	115	3987	N25	W82	1603	18	7	1	
Capri-S	31	b1558	1605	>07	49	3987	N25	W90				1-	Slow S-SWF
McMath	31	b1604				3987	N23	W90				?	
S.Peak	31	1905	1933	28	115	3996	S21	E20	1910	18	5	1	Slow S-SWF

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

S. Peak: unmarked McMath: ++
Capri-S: + Mitaka: *

May 01, 1420 (S14,W20)
1815 (S26,E50)

May 02, 1720 (S10,W67)
2253 (S24,E90)

May 03, b1300 (S26,E04)
1515 (S25,E03)

SOLAR FLARES

MAY 1957

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

S. Peak: unmarked   McMath: ++
Capri-S: +   Mitaka: *

May 03,	1745 (S26,E02)
	b2312 (S26,W02)
04,	b1252 (S05,W66)+
	1340 (S23,W17)
	b1343 (S22,W16)+
	1542 (S27,E87)
	1800 (S07,W65)
	2242 (S27,E88)
	2248 (S30,E77)
05	1215 (S26,W18)+
	1315 (S25,W25)
	1330 (S28,W90)
	1542 (S12,W70)
	1600 (N15,E90)
	b1657 (S25,W26)
06,	b1145 (S17,E42)+
	b1635 (N15,E70)++
	b2030 (N15,E65)++
07	1334 (N13,E58)+
	b1440 (N13,E51)
	b1632 (N13,E50)++
	b2110 (S10,W25)
	b2200 (S30,E34)
08,	b1221 (S32,E26)+
	2252 (S26,E20)
	2307 (S30,E34)
	2335 (S30,E35)
09,	b0018 (N11,E31)*
	b0522 (N13,E34)+
	0728 (S17,W08)+
	0921 (S23,E14)+
	b0949 (S27,E22)+
	1220 (S26,E24)+
	1329 (N13,E24)+
	1353 (N12,E22)
	b1440 (S27,E24)+
	1442 (S29,E24)
	1450 (S29,E26)
	1940 (S30,E23)
	b2117 (N10,E26)
	2107 (S30,E22)
	2312 (N12,E22)
	2325 (S22,W90)
10,	b0241 (S31,E20)*
	b0614 (N10,E17)*
	1932 (S31,W03)
	b2000 (S18,W25)
11,	1350 (N11,W05)
	b1418 (S17,W35)
	1640 (S17,W35)
	b1958 (S17,W37)
12,	0734 (N11,W09)+
	0952 (S24,W21)+
	1500 (N13,W16)
	1515 (N13,W12)+
	b1745 (S25,W20)
May 13,	b0205 (N12,W18)*
	1315 (S22,W38)
	1322 (S29,W30)
	1433 (N08,W37)
	b1437 (N09,W35)+
	1515 (N13,W26)
	1805 (N12,W27)
	1820 (N12,W30)
	1937 (N09,W22)
	2045 (S22,W38)
14,	b0829 (S22,E79)+
	1432 (S22,E75)
	1502 (N11,W42)
	1503 (N12,W42)+
	1655 (N12,W44)
	1735 (S21,E75)
15,	0738 (S11,E23)+
	0903 (S20,W53)+
	1315 (S19,W40)
	1405 (S10,E15)
	1518 (S19,W90)
	1530 (S19,W41)
	1538 (S34,W70)
	1607 (S18,W42)
	1630 (S17,W42)
	1705 (S12,E22)
	1740 (S17,W43)
	1748 (S20,W90)
	1755 (N11,W58)
	2020 (N15,W55)
	2045 (N15,W58)
	2152 (S12,E10)
	b2206 (S11,E08)*
	2237 (S17,W47)
16,	b0417 (S11,E10)*
	b1712 (S16,W56)
	1730 (S11,W01)
	1905 (S10,W02)
	1925 (S15,W57)
	2340 (N06,E53)
17,	1302 (S19,E90)
	1330 (S23,W90)
	1405 (S12,W08)
	1805 (N11,W90)
	2102 (N11,W87)
18,	0853 (N07,E33)+
19,	1415 (S16,W90)
	1715 (S18,E70)
	1750 (S13,E90)
20,	b0611 (S10,E85)+
	b1947 (S12,E75)
21,	b0613 (S18,W23)*
	1317 (N14,E46)
	1350 (S11,W14)
	1432 (S11,E65)
	b1603 (N14,E46)
May 21,	1630 (N14,E43)
22,	1535 (S17,W46)
	1608 (S17,W46)
	2127 (N09,W24)
	2335 (S15,W39)
23,	b0057 (S17,W51)*
	b0828 (S15,W52)+
	b1120 (S11,E40)+
	1357 (N18,E19)
	1742 (N17,E60)
	1800 (S20,W60)
	2022 (S23,W52)
	2325 (N15,E12)
24,	1740 (N20,E04)
	1810 (S20,W68)
	b1837 (S20,W33)
	1855 (S20,W68)
	2245 (N11,W55)
25,	1635 (S20,W83)
	1640 (S17,W80)
	1745 (S10,E10)
26,	1336 (N09,W78)
	1452 (N23,E11)
	1607 (N20,W26)
	1742 (N09,W80)
	2215 (S17,W16)
	2327 (S14,W62)
27,	2015 (S16,W60)
	b2329 (S15,W76)
	2345 (S16,W76)
28,	1518 (S19,W31)
	1540 (N25,W43)
	1725 (N25,W44)
	2105 (S17,E90)
29,	1119 (S16,E82)+
	b1700 (S10,W31)
	1712 (N25,W59)
	b2123 (N25,W62)
	2124 (S10,W32)
30,	b1004 (N19,W51)+
	1315 (S18,E36)
	1318 (S16,E37)+
	1327 (N19,W55)
	1400 (N25,W71)
	1415 (S23,W12)
	1420 (N40,W59)
	1510 (S24,W14)
	1700 (N25,W71)
	1852 (S19,E34)
	2202 (N25,W80)
	2300 (N25,W80)
31,	b0852 (S15,E24)+
	1405 (N09,E90)
	1632 (S19,E21)
	1722 (N08,E88)
	1957 (N25,W88)

IONOSPHERIC EFFECTS OF SOLAR FLARES

(SHORT-WAVE RADIO FADEOUTS)

APRIL 1957

Apr. 1957	Start UT	End UT	Type	Wide-spread Index	Impor-tance	Observation stations	Known Flare, UT CRPL-F 153B
1	0624	0655	S-SWF	1	1+	OK	
1	0725	0739	Slow S-SWF	5	1	OK, CW***	
1	1245	1410	G-SWF	3	1+	BE, MC, PR	b1319
1	1600	1622	Slow S-SWF	2	1-	BE, PR	
2	0250	0450	G-SWF	4	3	AN, OK, SY, TO+, CW+, CW++	b0255
2	0638	0718	S-SWF	2	1	AN, OK	
2	1915	2100	Slow S-SWF	5	3	BE, CO, HU, MC, NE**, PR, WS, CO, RCA+, RCA*	
3	0121	0149	Slow S-SWF	1	1+	OK, TO+	
3	0833	0908	G-SWF	5	2	MA++,NE**,OK,SW***,TO+,CW***,CW**	b0856
5	1408	1440	Slow S-SWF	5	2	BE,CO,DA*,HU,LI,MA,MC,NE**,PR,WS,CW**	
6	0127	0150	S-SWF	1	2	OK	
6	0837	0917	G-SWF	1	1	DA*, LI, NE**	
7	1500	1525	S-SWF	5	2-	BE, DA*, LI, MC, NE**, PR	1458
8	0338	0355	S-SWF	1	1	OK, TO+	b0342
8	0612	0700	Slow S-SWF	3	2	DA*, LI, NE**, OK, TO+	b0616
9	1412	1440	S-SWF	5	1	BE, HU, MC, NE**, PR	b1420
11	1731	1835	S-SWF	5	3	BE, CO, HU, MC, NE**, TO+, WS, RCA*	1722
12	1325	1352	Slow S-SWF	5	1	BE, HU, MC, NE**, PR	b1324
12	1856	2025	S-SWF	5	3+	AN,BE,CO,DA*,HU,MC,NE**,PR,WS,RCA+	1850
13	0425	0457	G-SWF	1	1	OK	
14	1710	1740	S-SWF	5	1+	AN,BE,CO,HU,MC,NE**,PR,WS	1708
15	0547	0623	G-SWF	1	1+	OK	b0556
15	0730	0833	Slow S-SWF	4	2	NE**, OK, TO+, SW***, CW***, CW**	
15	1354	1600	S-SWF	5	3	AN,BE,CO,HU,MA++,MC,NE**,PR,SW***,WS,RCA*,CW*, CW***,CW**	b1410
16	0140	0230	G-SWF	1	1+	OK	
16	1044	1200	S-SWF	5	3	MA++,MC,NE**,PR,SW***,RCA*,CW*,CW+,CW***,CW**	b1048
17	0128	0152	Slow S-SWF	2	2	OK, TO+	
17	0322	0422	G-SWF	3	3	OK, TO+, CW+, CW++	
17	0520	0600	G-SWF	2	2	AN, OK	
17	1004	1123	S-SWF	2	3	DA*,MA++, NE**,SW***,CW***,CW**	b1006
17	1455	1513	Slow S-SWF	5	1+	BE, CO, DA*, HU, MC, PR, WS	1455
17	1705	1725	Slow S-SWF	1	1-	MC, PR, WS	
17	1843	1910	S-SWF	4	2+	BE,CO,HU,MC,PR,WS,RCA*,RCA+	
17	1937	2220	Slow S-SWF	4	3+	BE,CO,HU,MC,PR,WS,RCA*,RCA+	2000
18	0907	0945	S-SWF	2	1+	NE,SW***, CW***, CW**	0907
18	1304	1340	S-SWF	5	2+	BE,CO,DA*,HU,MC,NE**,SW***,TO+,WS,RCA*,CW***,CW**	b1310
18	2021	2200	S-SWF	4	2+	BE, CO, HU, MC, TO+, WS, RCA+,	2025
18	2258	2318	S-SWF	5	1	OK, TO+, WS	
19	0343	0419	Slow S-SWF	1	1	OK	
19	0430	0610	G-SWF	1	3	OK	b0512
20	0330	0418	S-SWF	1	1+	OK	
20	1017	1050	Slow S-SWF	5	2	AN, MA++	
20	1107	1145	G-SWF	5	2-	DA*,NE**, PR, SW***, CW***, CW**	
20	1845	1855	Slow S-SWF	3	1	BE, MC, PR, WS	
21	0305	0342	G-SWF	1	1+	OK	
22	0009	0103	G-SWF	3	1	AN, OK	
22	0543	0615	Slow S-SWF	1	1-	OK	b0551
22	1423	1452	S-SWF	5	1+	BE,CO,DA*,HU,MC,NE**,PR,WS	1420
22	1725	1800	Slow S-SWF	4	2	BE, CO, HU, MC, PR, WS	
23	0146	0235	G-SWF	1	1	OK	
23	0616	0640	Slow S-SWF	3	1-	AN, OK	
24	0335	0520	G-SWF	3	1+	AN, OK	
24	1710	1732	Slow S-SWF	2	1-	MC, WS	
25	0022	0040	Slow S-SWF	1	2	OK	
25	0127	0140	Slow S-SWF	1	3	OK	
25	1315	1330	Slow S-SWF	5	1+	AN, BE, MC, NE**, PR	b1313
26	0630	0645	S-SWF	3	1	AN, OK	b0632
26	2041	2052	Slow S-SWF	4	1	AN, BE, HU, MC, PR, WS	2032
27	0028	0104	G-SWF	1	1	OK	
28	1540	1625	G-SWF	4	1	AN, BE, HU, MC, PR, WS	b1546

DA* Darmstadt, Germany
NE** Nederhorst den Berg, Netherlands
SW*** Enköping, Sweden
TO+ Hiraiso Radio Wave Observatory, Japan
MA++ Madrid, Spain
RCA* RCA Communications Inc., Riverhead, N.Y.

RCA+ RCA Communications, Inc., Pt. Reyes, Calif.
CW* Cable and Wireless, Barbadoes
CW** Cable and Wireless, Somerton, England
CW*** Cable and Wireless, Brentwood, England
CW+ Cable and Wireless, Hongkong
CW++ Cable and Wireless, Singapore

SOLAR RADIO WAVES (OTTAWA)--2800 MC

OUTSTANDING EVENTS

MAY 1957

May 1957	Type*	Start UT Hrs:Mins	Duration Hrs:Mins	Maximum Time UT Hrs:Mins	Maximum Peak Flux	Remarks
3	3	19 25	2 10	20 10	7	
4	2	19 50.5	1.5	19 51	10	
5	Group (2)	12 13.8	3.2			
	1	12 13.8	0.5	12 14	4	
	1	12 14.5	2.5	12 16	16	
5	2	16 01	2.5	16 01.2	7	
5	1	16 51.7	1.5	16 52	4	
5	1	17 30.5	1.5	17 31.2	17	
5	2	21 23.8	2	21 24.2	28	
5	1	23 20.7	1	23 21	7	
7	Group (2)	10 25	19.5			
	2	10 25	6	10 27.8	30	
	2	10 42	2.5	10 43	25	
7	2	12 03	2.5	12 03.5	9	
8	2	14 53	3	14 54	9	
8	Group (3)	20 14.5	33.7			
	6	20 14.5	2.5	20 15.1	22	
	2	20 30	6	20 31.3	23	
	1	20 47.7	0.5	20 48	4	
8	2	23 21.5	4	23 22.5	23	
9	1	13 25.7	1.5	13 26.2	5	
9	2	23 26.7	3	23 28	22	
10	3	12 52	1 20	13 12	15	
10	2	12 55	5	12 56.7	30	← {Superimposed on Rise and Fall
10	1	19 32.5	2	19 33.5	7	
11	2	15 15.5	6	15 17.6	20	
11	2	20 52	6	20 54	15	
11	2	21 56.5	3.5	21 57.3	6	
11	1	23 53	6	23 56.3	35	← In Sunset Osc.
12	3	12 00	1 30	12 13	16	
12	2	12 02.5	5	12 04.2	8	← {Superimposed on Rise and Fall
12	3	15 00	2	15 09	10	
12	2	17 44	5	17 45	20	
12	6	18 38	12	18 40	8	
12	3	22 30	1 10	22 55	10	
13	2	12 37.2	2	12 37.9	19	
13	Group (3)	20 44.9	3.1			
	1	20 44.9	0.6	20 45.1	8	
	1	20 45.5	0.8	20 46	8	
	1	20 46.7	1.3	20 47.2	21	

* See page 6.

SOLAR RADIO WAVES (OTTAWA)--2800 MC

OUTSTANDING EVENTS

MAY 1957

May 1957	Type*	Start UT Hrs:Mins	Duration Hrs:Mins	Maximum Time UT Hrs:Mins	Maximum Peak Flux	Remarks
14	1	10 44.5	2	10 45	7	
14	Group (3)	13 12.5	19			
	1	13 12.5	1	13 13	4	
	1	13 16	3	13 17.5	7	
	1	13 25.5	6	13 26.5	7	
14	Group (2)	14 18.5	11			
	2	14 18.5	2	14 19	12	
	2	14 24.5	5	14 26	14	
14	2	16 56.5	3	16 57.2	9	
14	2	18 37.5	10	18 38.5	410	
	4		30		16	
14	3	20 01	23	20 02	13	
				20 16	13	
14	1	21 27	11	21 29	9	
15	6	11 10	1.5	11 10.7	24	
15	3	12 33.5	8.5	indet.	11	
15	2	12 37	1	12 37.3	12	Superimposed on Rise and Fall
15	7	13 20.5	8	13 26	10	
15	1	14 06.3	1.5	14 07	13	
15	2	20 53	4.5	20 54.5	25	
16	6	12 43	10	12 45	83	
				12 47	83	
22	2	16 15	3	16 16	28	
22	1	17 55	2	17 56.7	8	
22	1	21 28.5	3	21 29.5	5	
24	3	16 04	14	indet.	7	
24	2	16 06.5	4.5	16 07.9	70	Superimposed on Rise and Fall
25	2	14 40.7	2	14 41	63	
25	3	15 38	1 25	16 10	7	
25	1	15 43	2	15 43.5	7	Superimposed on Rise and Fall
26	3	20 35	2 30	21 09	8	
26	1	20 37.5	3	20 38.7	12	Superimposed on Rise and Fall
27	1	17 56	2	17 57	24	
27	1	23 20.5	1	23 20.7	6	
27	1	23 27.7	1.5	23 28.2	8	
27	1	23 44.5	1.5	23 45	11	
31	1	19 04	1.5	19 04.5	7	
31	3	21 11.5	25	indet.	7	
31	7	21 12	9	21 14.5	15	Superimposed on Rise and Fall

* See page 6.

Note: During the period from 14:30 UT, May 17, to 15:00 UT, May 22, there were no continuous records due to failure of the antenna drive mechanism.

SOLAR RADIO WAVES (CORNELL)--200 MC

3-HOURLY FLUX

MAY 1957

May 1957	Flux Hours UT 12-15	15-18	18-21	Variability 12-15	15-18	18-21	Observed Periods Hours UT
1	[1.40	1.40	1.40]	[0	0	0]	1305-2000
2	[1.40	1.40	1.40]	[0	0	1]	1300-2000
3	[1.55	1.45	1.40]	[1	1	0]	1240-2000
4	[1.40	1.40	1.40]	[0	0	0]	1230-2000
5	[1.40	1.65	1.80]	[1	1	2]	1315-2000
6	[2.10	2.60	2.65]	[1	2	1]	1245-1925
7	[4.35	3.30	2.75]	[1	1	1]	1240-1550,1610-2000
8	[2.10	[2.00	2.10]	[1	[1	1]	1245-1305,1320-1510,1545-2005
9	[4.40	3.25	2.60]	[2	2	2]	1250-2000
10	[2.40	2.35	3.05]	[1	1	2]	1240-2015
11	[3.25	3.20	3.15]	[1	1	1]	1250-2005
12	[1.40	1.75	2.55]	[0	1	2]	1250-2015
13	[1.70	2.00	2.00]	[1	1	1]	1240-2010
14	[5.35	4.95	3.90]	[2	2	2]	1245-2005
15	[2.85	3.35	2.50]	[1	2	2]	1235-1440,1515-2010
16	[1.90	2.05	2.10]	[1	1	1]	1240-2015
17	[2.05	2.40	2.20]	[1	2	2]	1245-1710,1730-2005
18	[1.80	2.55	2.40]	[1	1	2]	1240-2000
19	[1.40	1.40	1.40]	[0	1	1]	1225-2000
20	[1.45	1.40	1.65]	[1	1	1]	1250-1300,1315-2000
21	[1.40	1.45	1.45]	[0	0	1]	1245-2010
22	--	--	--	-	-	-	
23	[1.40	1.40	1.40]	[1	1	1]	1250-2030
24	[1.45	1.55	1.40]	[1	1	0]	1300-1925
25	[1.45	[1.40	1.40]	[1	0	1]	1250-1430,1440-1515,1600-2010
26	[1.45	1.40]	1.40]	[1	0]		1250-1710,1800-2040
27	[[2.00	2.00	2.80]	[[1	1	1]	1400-2005
28	[2.70	2.90	3.50]	[1	1	2]	1240-2005
29	[1.60	1.45	1.45]	[1	0	1]	1245-2000
30	[[2.45	2.65	3.05]	[[2	2	2]	1440-2005
31	[2.70	2.75	2.55]	[2	2	2]	1240-2010

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

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

SOLAR RADIO WAVES (CORNELL)--200 MC

OUTSTANDING EVENTS

MAY 1957

May 1957	Type	Start UT	Duration Minutes	Maximum		Remarks
				Inst. Flux	Smd. Flux	
2	3	1832	2	>10.9	>10.9	
13	3	1604	1	>10.9	10.9	
13	3	1924 1/2	2 1/2	10.9	10.9	
15	3	1405 1/2	2 1/2	>10.9	>10.9	off-scale
15	3	1908	2 1/2	>10.9	>10.9	off-scale
15	2	2004	2 1/2			
16	2	1244	1 1/2			
17	3	1602 1/2	3	>10.9	>10.9	off-scale
17	3	1743	2	>10.9	>10.9	off-scale
19	3	1856 1/2	1/2	>10.9	>10.9	off-scale
20	3	1748 1/2	2 1/2	>10.9	>10.9	
20	3	1757	1	>10.9	>10.9	
23	3	1354	1 1/2	>10.9	>10.9	off-scale
24	3	1607	1	>10.9	>10.9	
25	3	1947 1/2	1	>10.9	>10.9	off-scale
30	2	1742	34			

Flux in terms of KTB.

SOLAR RADIO WAVES (BOULDER) -- 460 MC

3-HOURLY AND DAILY FLUX

MAY 1957

	Flux					Variability					Observed Periods
	Hours UT					Hours UT					
May 1957	12 15	15 18	18 21	21 24	Daily	12 15	15 18	18 21	21 24	Daily	Hours UT
1	76	--	72	70	72	0	--	0	0	0	1205-1506; 1838-2535
2	--	--	80	74	77	--	--	0	0	0	1900-2535
3	--	76	77	75	76	--	(0)	(0)	0	(0)	1500-2535
4	--	84	84	80	83	--	0	0	0	0	1430-2540
5	84	84	86	84	85	0	1	0	1	1	1155-2540
6	84	83	78	78	80	0	0	0	0	0	1155-2540
7	93	94	90	92	92	1	0	1	0	1	1155-2540
8	87	87	86	85	86	0	0	0	(0)	(0)	1150-2540
9	--	108	94	93	101	--	0	1	2	2	1408-2545
10	--	98	89	82	91	--	0	0	0	0	1416 2545
11	96	91	91	89	91	0	0	0	(0)	(0)	1150-2545
12	100	92	99	96	96	0	(0)	0	(0)	(0)	1145-2545
13	104	101	90	92	96	0	0	1	0	1	1145-2545
14	131	100	92	89	102	0	0	(0)	--	(0)	1145-2245; 2355-2545
15	114	97	85	94	97	2	0	1	1	2	1145-2545
16	--	101	82	89	90	--	0	0	0	0	1400-2550
17	--	89	81	86	88	--	0	0	0	0	1415-2550
18	105	91	88	94	94	0	0	0	0	0	1140-2550
19	89	82	76	83	82	0	0	0	0	0	1140-2550
20	93	87	85	95	90	0	2	0	2	2	1140-2550
21	96	83	82	87	86	2	0	0	0	2	1140-2555
22	87	79	80	87	82	1	0	0	(2)	(2)	1140-2555
23	--	84	80	81	83	1	0	(0)	0	1	1345-2555
24	--	85	80	78	82	0	1	0	0	1	1343-2555
25	87	--	80	81	82	0	0	0	0	0	1135-2212; 2321-2555
26	80	82	79	83	81	0	0	1	0	1	1135-2430
27	--	82	80	86	83	--	0	0	0	0	1445-2430
28	--	81	77	81	81	--	0	0	(0)	(0)	1410-1937; 2115-2600
29	80	71	66	72	72	0	0	0	0	0	1135-2600
30	--	77	74	83	78	--	0	0	0	0	1400-2600
31	83	77	74	80	78	0	0	0	2	2	1135-2600

SOLAR RADIO WAVES (BOULDER) -- 460 MC

OUTSTANDING EVENTS

MAY 1957

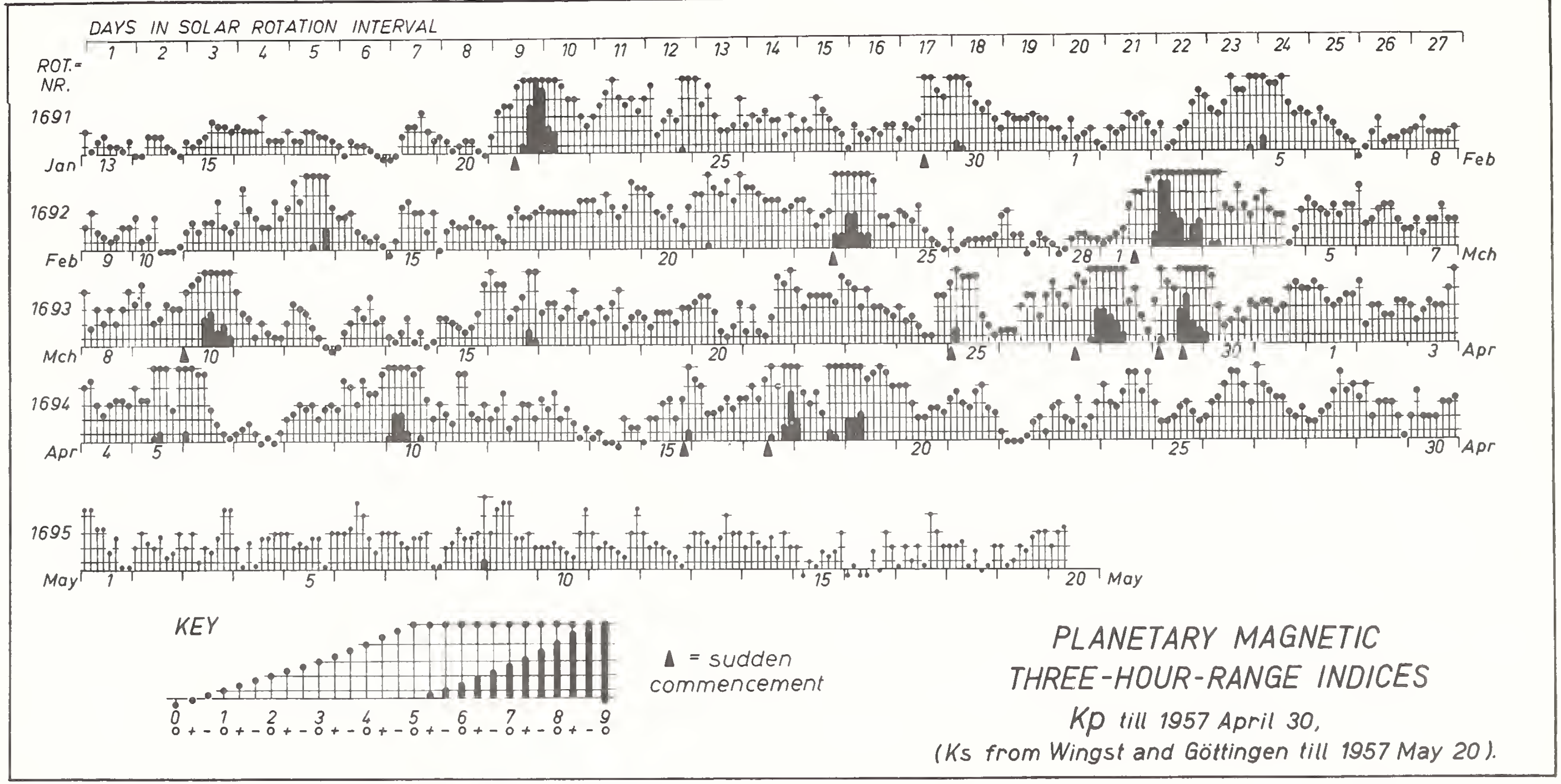
May 1957	Type	Start UT	Duration Hrs:Mins	Maximum Time UT	Maximum Inst. Flux	Maximum Smd. Flux	Remarks
5	2	1601.1	00:01.1	1601.9	240	71	
5	2	2123.3	00:01.6	2124.3	460	82	
5	3	2321.9	00:00.4	2321.9	270	--	
7	6	(1155)	(13:45)	~1500	--	23	
7	3	1457.0	00:00.3	1457.1	260	--	
7	3	1944.4	00:00.5	1944.5	1300	--	
9-18	6	(1408)	(10 days)	~1200*	--	26	*May 14
9	3	2431.6	00:00.3	2431.9	720	--	
9	8	2440.8	00:02.7	2442.6	1400	210	
12	3	2519.7	00:00.8	2519.7	230	--	
13	2	2046.9	00:01.7	2047.3	480	94	
15	8	1406.0	00:02.1	~1406.7	>3400	740	
15	3	2402	00:03	2402.8	1200	200	
20-21	6	(1140)	(2 days)	~2300*	--	18	*May 20
20	2	1748.6	00:01.1	1748.6	850	--	
20	2	2241.4	00:00.2	2241.5	>2000	--	
21	2	1222.0	00:01.0	1222.1	450	--	
22	2	1318.5	00:02.0	1319.9	440	80	
22	2	2242.1	00:01.0	2243.0	400	--	
22	3	2459.0	00:00.4	2459.2	360	--	
23	3	1352.5	00:03.7	1354.6	240	73	
24	3	1604.9	00:04.6	1607.8	200	56	
26	2	2035.7	00:09	2043.3	210	20	
28	2	2201	00:05	2204.3	270	63	

Note 1. Frequent interference may have obscured some small solar events. Relatively small events not reported.

GEOMAGNETIC ACTIVITY INDICES

APRIL 1957

Apr. 1957	C	Values Kp — Three hour Gr. interval 1	2	3	4	5	6	7	8	Sum	Ap	Final Selected Days
1	1.0	4o	4+	4o	3+	3o	3+	4-	4-	29+	23	Five
2	0.8	4+	2-	3o	3o	2+	2+	3+	3+	23+	15	Quiet
3	1.0	3o	2o	3-	3+	3o	3o	4o	5o	26o	20	
4	0.8	4o	4+	3o	2+	3o	3+	3+	3o	26+	19	7
5	1.3	4o	3+	3+	5+	6-	5o	3-	5o	34+	37	13
												14
6	1.1	6-	5o	5-	5-	3-	2-	1o	1-	26o	27	22
7	0.1	1o	1+	2-	1o	0+	1-	0+	1o	7+	4	25
8	0.6	2o	2+	3o	3-	3o	2o	3-	3o	21-	12	
9	1.1	3-	4+	4o	3o	4+	4-	4-	5-	30+	25	
10	1.5	5+	7-	7-	6-	5-	5+	3+	2o	40-	58	
11	0.8	3o	2+	2-	5-	5-	2+	2o	3o	24-	17	Five
12	0.8	2o	3-	4-	1+	2o	3o	3o	2o	20-	11	Disturbed
13	0.5	3+	3-	4-	2o	3-	2-	1-	1+	18o	11	
14	0.1	1-	1o	0+	0+	0o	2o	1+	1+	7o	4	5
15	1.0	0+	2o	2o	3o	3+	2o	3+	6-	22-	18	10
												17
16	1.0	4+	4o	2+	2+	3-	3+	3-	3+	25o	17	18
17	1.6	3+	4o	3+	4+	5+	4o	6o	8-	38o	55	19
18	1.5	6+	4-	3o	4-	2+	6-	5+	5o	35o	42	
19	1.6	6+	6+	7-	4+	5-	5o	5-	4o	42o	60	
20	0.7	4o	4o	3o	2o	2o	3-	3-	2+	23-	14	
21	0.9	3+	4-	3o	3-	4-	4o	3-	2+	25+	17	Ten
22	0.2	1o	0+	0+	0+	1-	2-	2o	1o	7+	4	Quiet
23	0.6	3-	3o	2o	2-	3+	1+	2o	3o	19o	11	
24	1.1	4o	3o	3-	4-	5-	5-	4-	5-	31o	27	7
25	0.4	3o	2-	2-	2o	3-	3o	2+	2-	18o	10	8
												12
26	1.1	2o	3o	3+	4o	5-	5-	4o	3o	29-	23	13
27	0.9	5o	4o	4-	3+	3+	2+	2o	3-	26+	20	14
28	0.9	2-	2-	2+	3-	4-	5-	4-	4o	24+	18	22
29	0.8	3+	4o	2o	3o	3o	3o	2o	1-	21o	13	23
30	0.8	2o	4-	2o	2o	2o	3o	3o	3+	21o	12	25
												29
												30
Mean:	0.89									Mean:	21	



PLANETARY MAGNETIC THREE-HOUR-RANGE INDICES
Kp till 1957 April 30,
(Ks from Wingst and Göttingen till 1957 May 20).

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH ATLANTIC

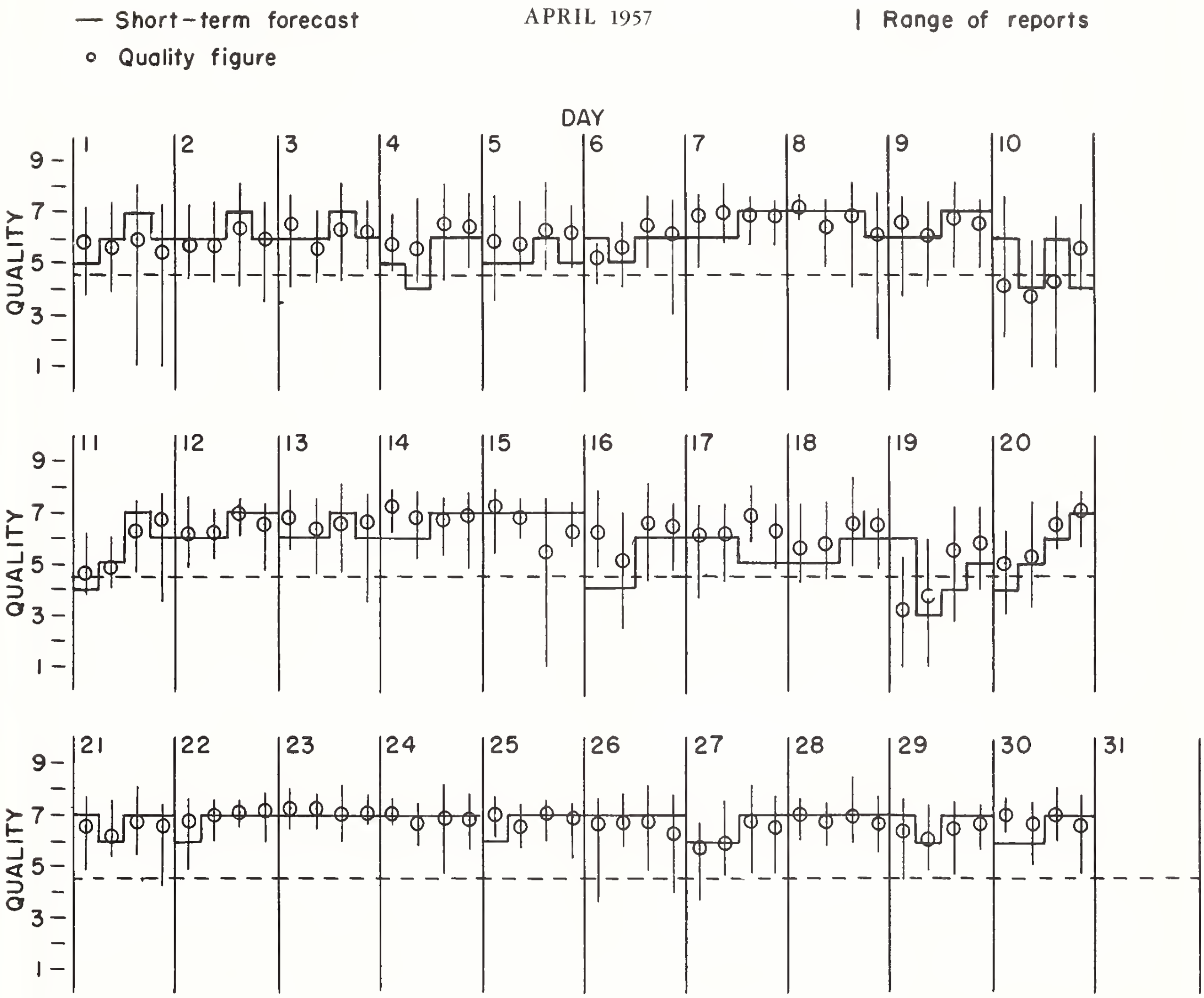
APRIL 1957

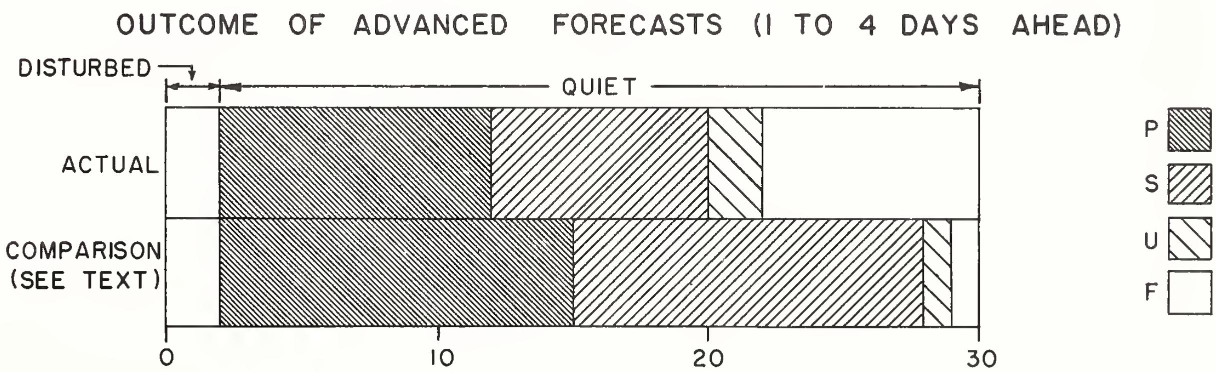
Apr. 1957	North Atlantic 6-hourly quality figures				Short-term forecasts issued about one hour in advance of:				Whole day index	Advance forecasts (J-reports) for whole day; issued in advance by:			Geomagnetic K_{Fr}	
	00 to 06	06 to 12	12 to 18	18 to 24	00	06	12	18		1-4 days	4-7 days	8-25 days	Half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

Score:		00	06	12	18	1-4 days	4-7 days
Quiet Periods	P	11	19	18	20	10	19
	S	16	8	9	9	8	9
	U	0	0	1	0	2	0
	F	1	1	1	1	8	0
Disturbed Periods	P	0	1	0	0	0	1
	S	0	1	0	0	0	0
	U	0	0	0	0	0	0
	F	2	0	1	0	2	1

( ) represent disturbed values.

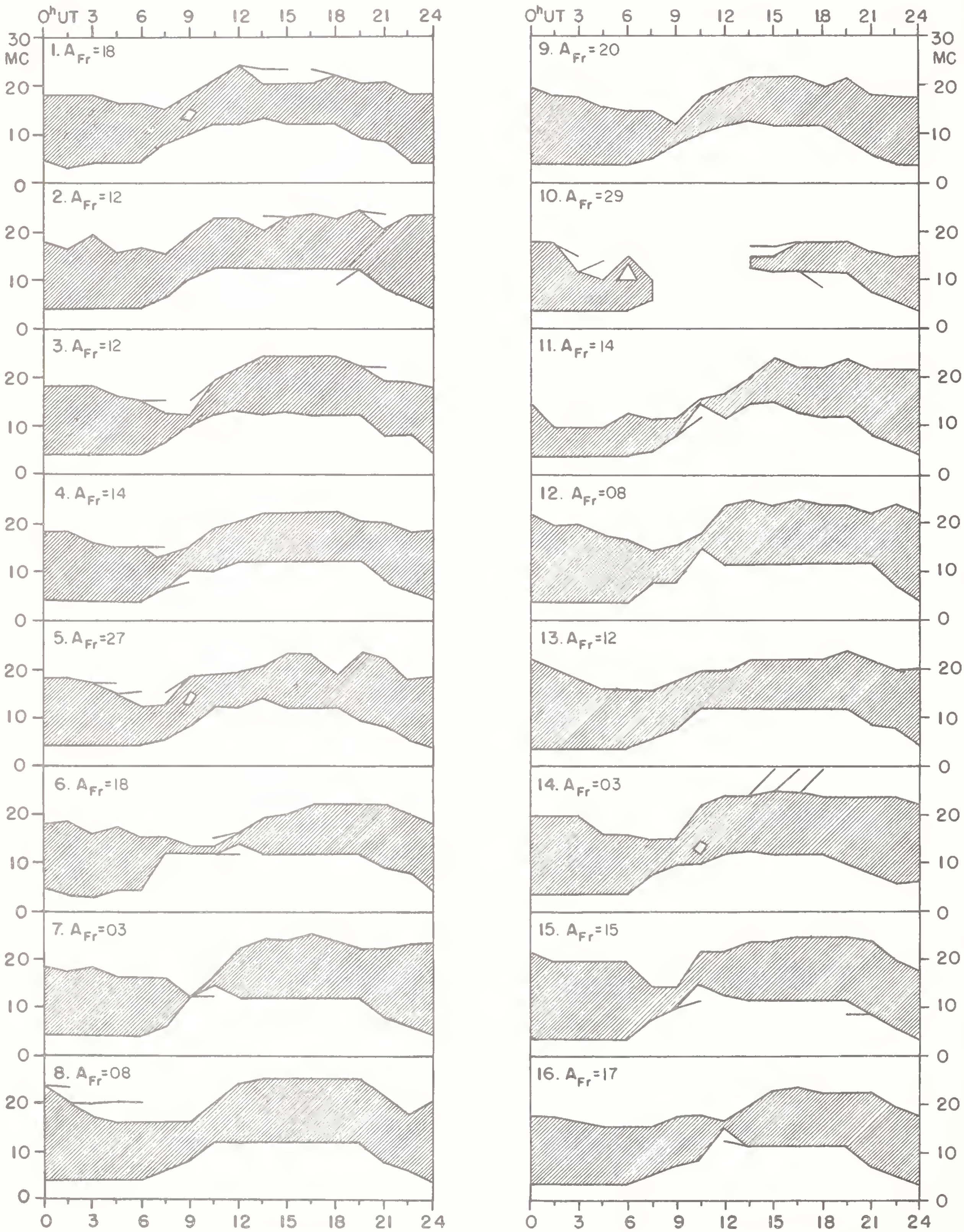
CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS
NORTH ATLANTIC



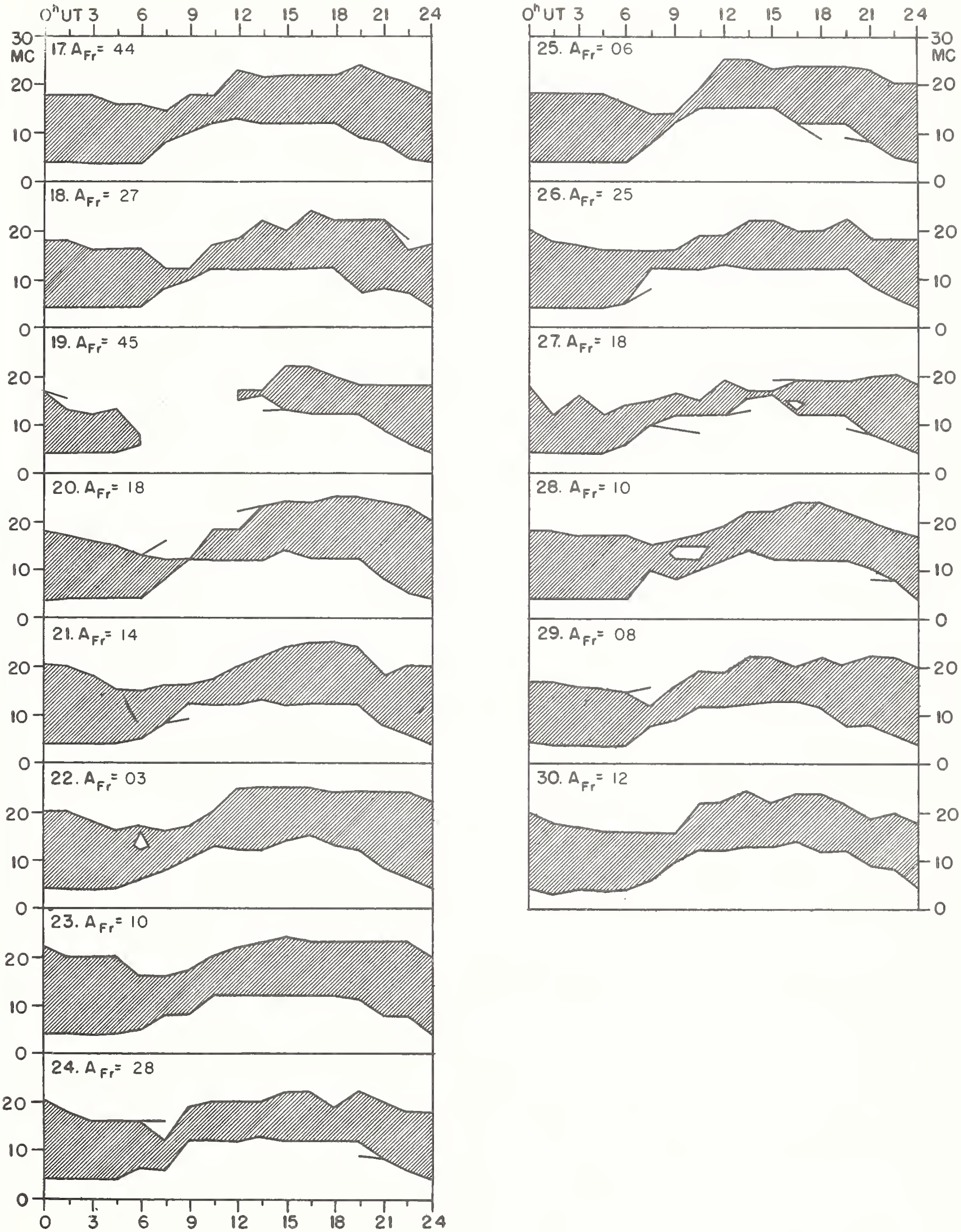


USEFUL FREQUENCY RANGES -- NORTH ATLANTIC PATH

APRIL 1957



APRIL 1957



Adapted from Observations by Deutsches Bundespost

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH PACIFIC

APRIL 1957

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

Score:		02	10	18	1-4 days	4-7 days
Quiet Periods	P	9	10	10	10	7
	S	15	13	16	8	17
	U	0	0	1	4	2
	F	1	1	1	5	1
Disturbed Periods	P	0	2	1	0	0
	S	3	1	1	0	0
	U	1	1	0	1	0
	F	1	1	0	2	3

( ) represent disturbed values.

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

NORTH PACIFIC

APRIL 1957