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SUBJECT Solar Activity

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Contents: Geomagnetic and Solar Data

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Arrangement: Chronologically by month.

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JPL 0893-S JUN 62

# Selected Geomagnetic and Solar Data

J. VIRGINIA LINCOLN

*National Bureau of Standards, Boulder, Colorado*

$K_p$, $C_i$, $C_p$, $A_p$, $K_{Fr}$, $R_o$ and Selected Days, April 1962

| Day[1] | 3-hr Range Indices $K_p$[2] 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Prel.[3] $C_i$ | $C_p$[4] | $A_p$[5] | 3-hr Range Indices $K_{Fr}$,[6] Values | Sum | Prov.[7] $R_o$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1o | 3o | 4− | 4− | 2+ | 1+ | 1+ | 2− | 18o | 0.6 | 0.6 | 11 | 1345 2112 | 19 | 37 |
| 2 | 1− | 2+ | 0+ | 1o | 1o | 2− | 3o | 4+ | 14+ | 0.7 | 0.5 | 9 | 1301 2134 | 15 | 31 |
| 3 | 4o | 3− | 4− | 2o | 2− | 3− | 2o | 3− | 21+ | 0.8 | 0.8 | 13 | 4332 2222 | 20 | 30 |
| 4 | 2+ | 2+ | 4− | 4o | 2− | 2− | 1+ | 3o | 20o | 0.7 | 0.7 | 12 | 2244 2213 | 20 | 24 |
| 5 q | 4− | 3o | 1− | 2− | 1o | 0+ | 1− | 1− | 12− | 0.4 | 0.4 | 7 | 3311 1012 | 12 | 27 |
| 6 D | 2− | 4o | 4− | 5− | 3o | 3− | 5− | 5+ | 30− | 1.3 | 1.2 | 27 | 2434 3354 | 28 | 21 |
| 7 D | 5+ | 6− | 5o | 6− | 6− | 5+ | 5+ | 5o | 43o | 1.6 | 1.7 | 58 | 5555 4445 | 37 | 23 |
| 8 D | 5− | 4o | 3o | 3− | 4− | 6+ | 4o | 4− | 32o | 1.4 | 1.3 | 32 | 5433 3533 | 29 | 22 |
| 9 | 4o | 1+ | 3o | 2− | 3o | 3− | 2− | 2o | 19+ | 0.8 | 0.7 | 12 | 4131 2232 | 18 | 15 |
| 10 D | 2+ | 4− | 2o | 4+ | 5o | 5− | 5o | 5− | 32− | 1.4 | 1.3 | 30 | 2424 4434 | 27 | 10 |
| 11 | 5− | 4+ | 3+ | 4− | 4− | 4− | 2o | 3− | 28o | 1.1 | 1.1 | 22 | 5444 3322 | 27 | 21 |
| 12 | 3+ | 3− | 1− | 1o | 2o | 2+ | 2− | 3− | 16+ | 0.5 | 0.5 | 9 | 3211 2223 | 16 | 35 |
| 13 Q | 3o | 1o | 1o | 0+ | 0+ | 1+ | 1o | 1+ | 9+ | 0.2 | 0.2 | 5 | 3110 0100 | 06 | 55 |
| 14 Q | 2+ | 0+ | 0o | 0+ | 0+ | 0+ | 1− | 1− | 5o | 0.1 | 0.1 | 3 | 2000 0010 | 03 | 75 |
| 15 | 1+ | 2+ | 1o | 0+ | 2− | 4− | 3− | 3o | 16o | 0.7 | 0.5 | 9 | 2310 2234 | 17 | 84 |
| 16 q | 3+ | 2+ | 1o | 1− | 1− | 1+ | 2o | 2o | 13+ | 0.5 | 0.4 | 7 | 3211 1122 | 13 | 90 |
| 17 q | 3+ | 3+ | 2− | 2− | 2− | 1+ | 1+ | 1o | 15+ | 0.3 | 0.5 | 8 | 4321 1122 | 16 | 86 |
| 18 | 0+ | 3− | 2+ | 3− | 4− | 3o | 3+ | 2o | 20o | 0.7 | 0.7 | 12 | 0222 3232 | 16 | 66 |
| 19 q | 4− | 3− | 2+ | 1− | 0+ | 1− | 0o | 1+ | 12− | 0.4 | 0.4 | 7 | 4321 0102 | 13 | 71 |
| 20 | 3− | 3− | 1+ | 1− | 1− | 3o | 2− | 4o | 17− | 0.7 | 0.6 | 10 | 2211 1224 | 15 | 72 |
| 21 | 3+ | 2o | 3− | 3− | 1o | 5o | 4o | 4+ | 25o | 1.3 | 1.0 | 20 | 3232 1434 | 22 | 75 |
| 22 D | 4+ | 5o | 4+ | 4o | 4− | 5− | 3+ | 4− | 33o | 1.3 | 1.3 | 30 | 4543 3333 | 28 | 78 |
| 23 | 3+ | 4− | 3o | 3o | 3− | 2+ | 1o | 1o | 20o | 0.7 | 0.7 | 12 | 3443 2211 | 20 | 75 |
| 24 Q | 1− | 0+ | 1− | 1− | 2+ | 2o | 2o | 0o | 9− | 0.2 | 0.1 | 4 | 0011 2120 | 07 | 46 |
| 25 | 1− | 0o | 2o | 4o | 3o | 4o | 3+ | 1o | 18o | 0.8 | 0.7 | 13 | 1034 2332 | 18 | 36 |
| 26 | 2o | 3o | 4o | 2+ | 3− | 2− | 1+ | 2o | 19o | 0.9 | 0.6 | 11 | 2353 2121 | 19 | 32 |
| 27 q | 2o | 3− | 2− | 2− | 1+ | 2o | 2+ | 1o | 15− | 0.5 | 0.4 | 7 | 2322 2122 | 16 | 32 |
| 28 | 2− | 2+ | 3o | 1+ | 1+ | 2+ | 2o | 2+ | 16+ | 0.4 | 0.4 | 8 | 1331 1232 | 16 | 41 |
| 29 Q | 2o | 2− | 1o | 1+ | 2+ | 1o | 2o | 1+ | 13− | 0.3 | 0.3 | 6 | 2211 2122 | 13 | 44 |
| 30 Q | 2o | 1− | 1− | 1− | 0+ | 2− | 2o | 2− | 10− | 0.2 | 0.2 | 5 | 3111 0122 | 11 | 34 |
| | | | | | | | | | Means: | 0.72 | 0.66 | 14 | | | 46.3 |
| | | | | | | | | | No. of days: | 30 | 30 | 30 | | | 30 |

[1] Five quite days (Q), ten quiet days (Q or q), five disturbed days (D) selected by Commission on Characterization of Magnetic Disturbances, J. Veldkamp, Kon. Nederlandsch Meteorologisch Institute, DeBilt, Holland.

[2] Geomagnetic planetary 3-hr range indices $K_p$ prepared by Committee on Characterization of Magnetic Disturbances, J. Bartels, Chairman, University, Gottingen, Germany.

[3] Preliminary magnetic character figures, $C_i$, prepared by J. Veldkamp

[4] Magnetic character figures, $C_p$, prepared by J. Bartels.

[5] Average amplitudes, $A_p$ (nanoteslas), prepared by J. Bartels.

[6] Fredericksburg 3-hr range indices, $K_{Fr}$ [illegible] values [illegible] in [illegible]/mm $D = 2.7$; $H = [illegible]5$, $Z = 3.0$), prepared by Robert [illegible] Observer-in-charge Fredericksburg Magnetic Observatory, [illegible] Virginia.

[7] Provisional [illegible] observations at Zurich Observatory and [illegible] Locarno and [illegible] Swiss Federal Observatory, Zurich, Switzerland.

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## PRINCIPAL MAGNETIC STORMS

(Advance knowledge of the character of the records at some observatories as regards disturbances)

| Observatory (Observer-in-Charge) | Greenwich Date | Storm Time | | Sudden Commencement | | | | C Figure, Degree of Activity[4] | Maximal Activity on K Scale 0 to 9 | | | Ranges | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GMT of Begin. | GMT of Ending[1] | Type[2] | Amplitudes[3] D | H | Z | | Gr. Day | Gr. 3-hr Period | K Index | D | H | Z |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
| | *1960* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| Macquarie Island (C. H. van Erkelens) | Jan. 5 | 02 01 | 6 06 | s.c.* | −6* | −11 | −5 | m | 5 | 3,4,5 | 6 | 85 | 743 | 426 |
| | Jan. 10 | 07 00 | 11 .. | ..... | ..... | ..... | ..... | ms | 10 | 4,5 | 7 | 137 | 1060 | 605 |
| | | | No | record | at | end | of | storm | | | | | | |
| | Jan. 13 | 19 00 | 15 05 | s.c.* | +22* | −95 | +77 | ms | 15 | 1,2 | 7 | 122 | 1178 | 486 |
| | Jan. 21 | 00 40 | 22 02 | ..... | ..... | ..... | ..... | ms | 21 | 4,7 | 7 | 162 | 916 | 665 |
| | Feb. | | NIL | | | | | | | | | | | |
| | Mar. 15 | 13 40 | 17 17 | ..... | ..... | ..... | ..... | m | 15 | 7 | 6 | 107 | 1153 | 616 |
| | | | | | | | | | 16 | 1,2,6,7 | 6 | | | |
| | Mar. 31 | 04 10 | | ..... | ..... | ..... | ..... | s | 31 | 4,6 | 9 | 380 | 2827 | 1372 |
| | Apr. | | 2 13 | | | | | | 1 | 6,7 | 9 | | | |
| | Apr. 2 | 23 12 | 3 10 | s.c.* | −18* | +81 | −56 | ms | 3 | 2 | 8 | 155 | 1058 | 710 |
| | Apr. 23 | 18 00 | 26 02 | ..... | ..... | ..... | ..... | ms | 24 | 5,7 | 7 | 136 | 1247 | 642 |
| | | | | | | | | | 25 | 3 | 7 | | | |
| | Apr. 27 | 20 05 | | s.c.* | +13* | −123* | −100* | s | 30 | 6,7 | 9 | 336 | 5034 | 2862 |
| | May | | 1 06 | | | | | | | | | | | |
| | May 6 | 07 40 | 7 21 | ..... | ..... | ..... | ..... | ms | 6 | 6,7 | 7 | 236 | 1334 | 802 |
| | May 8 | 04 22 | 8 21 | s.c.* | −25* | +430* | −250* | s | 8 | 5,6 | 8 | 251 | 2271 | 929 |
| | June 4 | 02 53 | 5 17 | s.c. | +9 | +69 | −56 | m | 4 | 4 | 7 | 128 | 983 | 600 |
| | | | | | | | | | 5 | 3 | 7 | | | |
| | June 27 | 01 47 | 28 14 | s.c.* | −10* | +139 | −98 | m | 28 | 4 | 7 | 170 | 1316 | 918 |
| | Jul. 15 | 06 40 | 16 21 | ..... | ..... | ..... | ..... | s | 15 | 6,7 | 8 | 251 | 1953 | 1316 |
| | | | | | | | | | 16 | 4 | 8 | | | |
| | Aug. 16 | 11 25 | 18 15 | ..... | ..... | ..... | ..... | ms | 17 | 6,7 | 8 | 182 | 1525 | 1204 |
| | Aug. 29 | 00 22 | 30 19 | s.c.* | −28* | −50 | +53 | ms | 30 | 3,4 | 7 | 227 | 1355 | 838 |
| | Sep. 4 | 02 30 | 6 01 | s.c.* | −7* | −31 | +21 | s | 4 | 3 | 9 | 381 | 1630 | 1121 |
| | Sep. 30 | 01 30 | | ..... | ..... | ..... | ..... | ms | 1 | 3,5 | 7 | 234 | 1620 | 700 |
| | Oct. | | 2 20 | | | | | | 2 | 3,4,5,6 | 7 | | | |
| | Oct. 4 | 09 30 | 4 21 | ..... | ..... | ..... | ..... | ms | 4 | 5,7 | 7 | 171 | 934 | 597 |
| | Oct. 6 | 01 30 | 7 21 | ..... | ..... | ..... | ..... | s | 7 | 3 | 9 | 455 | 2054 | 1328 |
| | Oct. 15 | 10 42 | 15 23 | s.c.* | +12* | −63 | +56 | m | 15 | 6 | 7 | 51 | 737 | 615 |
| | Oct. 25 | 02 20 | 26 22 | ..... | ..... | ..... | ..... | ms | 25 | 6,7 | 8 | | 1952 | 1223 |
| | Oct. 27 | 08 30 | 28 21 | ..... | ..... | ..... | ..... | ms | 28 | 4,5,6,7 | 7 | 217 | 1435 | 624 |
| | Nov. 4 | 02 00 | 4 17 | ..... | ..... | ..... | ..... | m | 4 | 3 | 8 | 138 | 1182 | 661 |
| | Nov. 12 | 13 49 | 14 03 | s.c. | +4 | −50 | +63 | s | 12 | 6,7 | 9 | 461 | 4420 | 2510 |
| | | | | | | | | | 13 | 3,4,5 | 9 | | | |
| | Nov. 15 | 02 20 | 16 16 | s.c. | 0 | +63 | −49 | s | 15 | 5,6 | 8 | 323 | 2362 | 1458 |
| | | | | | | | | | 16 | 1 | 8 | | | |
| | Nov. 21 | 04 00 | 21 20 | ..... | ..... | ..... | ..... | m | 21 | 6,7 | 7 | 201 | 1607 | 720 |
| | Nov. 24 | 21 00 | 25 22 | ..... | ..... | ..... | ..... | m | 25 | 4,6 | 7 | 143 | 1105 | 723 |
| | Nov. 30 | 19 09 | | s.c.* | +10* | +48 | −36 | ms | 1 | 1,2,3,4,5,6 | 7 | 320 | 2060 | 955 |
| | Dec. | | 2 02 | | | | | | | | | | | |
| | Dec. 15 | 06 00 | 16 14 | ..... | ..... | ..... | ..... | ms | 15 | 5,6,7 | 7 | 330 | 1972 | 1057 |
| | | | | | | | | | 16 | 4 | 7 | | | |
| | Dec. 27 | 05 00 | 27 21 | ..... | ..... | ..... | ..... | ms | 27 | 4 | 8 | 242 | 1641 | 1045 |

[1] Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces; more specifically, when the K-index measure diminished to 2 or less for a reasonable period.

[2] s.c. = sudden commencement; s.c.* = small initial impulse followed by main impulse (the amplitude in this case is that of the *main impulse* only, neglecting the initial brief pulse); ... = gradual commencement.

[3] Signs of amplitudes of D and Z taken algebraically; D reckoned positive if toward the east and Z reckoned positive if vertically downward.

[4] Storm described by three degrees of activity: *m* for moderate (when K index as great as 5); *ms* for moderately severe (when K = 6 or 7); *s* for severe (when K = 8 or 9).

# "Geomagnetic and Solar Data"

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## INTERNATIONAL DATA ON MAGNETIC DISTURBANCES

This report continues the series which has appeared regularly in this Journal since vol. 54, no. 3, 295, 1949. Please refer to that first report for an explanation of the data given, and to vol. 59, no. 3, 423, 1954, for the definition of $A_p$.

*Note.* Additional and final Geomagnetic and Solar Data appears in due course in the following international publications: *Quarterly Bulletin on Solar Activity*, International Astronomical Union, c/o Eidgen. Sternwarte, Zurich, Switzerland; *IAGA Bulletins, Geomagnetic Indices K and C* by J. Bartels, A. Romaña, and J. Veldkamp, International Union of Geodesy and Geophysics, Association of Geomagnetism and Aeronomy, c/o V. Laursen, Meteorologisk Institut, Charlottenlund, Denmark.

## SUDDEN COMMENCEMENTS AND SOLAR-FLARE EFFECTS, FIRST QUARTER 1962

### Preliminary Report of Sudden Commencements

S.c.'s given by ten or more stations are in italics. Times are mean values obtained from normal magnetograms.

*Sudden commencements followed by a magnetic storm or a period of storminess (s.s.c.)*

1962 January *10d 02h 13m:* forty.—*19d 01h 13m:* forty-four (ssc: 43; si: 1).

1962 February 04d 09h 30m: thirty.—06d 21h 01m: Wn? Ma Db Pr CF (si: Fu; pt: Ag).—*11d 09h 58m*: twelve (ssc: 10; si: 2).—15d 16h 19m: Pe Qu MB (bp: Hr; pt: Gn).—15d 18h 13m: SF Mc (pt: Me).—*23d 02h 20m*: forty-five (ssc: 40; si: 4; sfe: Qu?).—26d 08h 34m: Fr Pe MB PM Tn Gn.—*26d 12h 33m*: thirty-eight (ssc: 37; si: 1).

1962 March 01d 11h 09m: So MB.

*Sudden impulses found in magnetograms (s.i.)*

1962 January *10d 09h 39m*: twenty-four (si: 20; ssc: 4).—10d 19h 46m: Le Es.—12d 11h 13m: So Fu.

1962 February 05d 03h 15m: So Me Ks Gu Va Gn Hr To Am.—11d 13h 18m: Fu Lg (ssc: Pe).—11d 19h 49m: Pe Qu Hu.—*14d 17h 21m*: Es Fu Lg Tn (ssc: Pe MB Mc Hu; bs: Ks; sfe: Tl TC).—14d 23h 04m: Lg Tl Qu TC Mc (bs: Hu).—15d 18h 55m: Es Vl Pr Fu CF Pe Te (ssc: Ci).—15d 19h 29m: Vl Pr CF Pe.—*16d 05h 39m:* Pe Qu Te MB Va Gn Hr To Am (ssc: Pr CF SF Mc Hu).—25d 17h 30m: Fu CF Lg MB (ssc: Ma; bs: Ks; sfe: Tl).—26d 15h 33m: Le Es Wi Ma Db CF Te.—26d 15h 52m: Le Wi CF.—26d 16h 11m: Le Es Me Db CF Te.—27d 02h 19m: Me Te (b: Pe; sfe: Qu).

1962 March *03d 13h 11m*: thirteen (si: 11; ssc: 1; pg: 1).—*03d 13h 40m*: thirteen (si: 10; ssc: 2; pt: 1).—10d 08h 41m: So Wn Vl Pr Fu (ssc: Ma Lg).—17d 05h 31m: Vl Fu PM Gn.

### Preliminary Report on Solar-Flare Effects (s.f.e.)

Effects confirmed by ionospheric or solar observations are in italics.

1962 January 07d 11h 28m—11h 36m: Tn.—*09d 16h 18m*: Hu.—*09d 17h 28m*: Hu (b: Pe).—*27d 14h 28m*: Hu.

1962 February *01d 15h 53m*: Hu.—*01d 16h 40m*: Hu.—*01d 16h 55m*: Hu.—*07d 13h 49m*: Hu.—17d 15h 38m: Hu.—*19d 13h 30m*: Hu.—20d 05h 54m-06h 00m: Tn.—*22d 14h 10m*: Hu.

1962 March 01d 16h 40m: Te (b: Pe).—01d 21h 20m: Te.—*02d 12h 17m*: CF Ag Hu (si: Vl Pr Fu; b: Pe TC).—04d 10h 25m: TC (si: MB; b: Pe).—*13d 14h 48m*: Wn Ma TC (si: Fu MB).—17d 19h 39m: Te.—24d 14h 00m: Hu.—*25d 12h 27m*: Le Ma (b: Pe).—27d 18h 02m: Ag.—*31d 08h 38m*: Wi.—31d 15h 45m: Hu.

## COMMITTEE ON RAPID VARIATIONS AND EARTH CURRENTS

A. ROMAÑA, Observatorio del Ebro, Tortosa, Spain

## SELECTED GEOMAGNETIC AND SOLAR DATA

$K_p$, $C_i$, $C_p$, $A_p$, $K_{Fr}$, $R_z$ and Selected Days, May 1962

| Day[1] | 3-hr. Range Indices $K_p$[2] 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Prel.[3] $C_i$ | $C_p$[4] | $A_p$[5] | 3-hr. Range Indices $K_{Fr}$[6] Values | Sum | Prov.[7] $R_z$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4− | 2− | 1o | 1o | 1− | 1− | 3− | 3o | 14+ | 0.6 | 0.5 | 9 | 4221 0133 | 16 | 49 |
| 2 | 2o | 2+ | 3+ | 2o | 2− | 3− | 2− | 2+ | 18o | 0.6 | 0.5 | 9 | 2332 1223 | 18 | 48 |
| 3 | 3o | 2+ | 2− | 2o | 1+ | 1− | 2− | 1o | 14− | 0.4 | 0.3 | 7 | 3322 1021 | 14 | 46 |
| 4 Q | 1− | 0o | 1+ | 0o | 0o | 0o | 0+ | 1o | 3+ | 0.0 | 0.0 | 2 | 2020 0011 | 6 | 42 |
| 5 | 0o | 0o | 1− | 0+ | 0+ | 1− | 1+ | 3o | 6+ | 0.2 | 0.1 | 4 | 0010 1123 | 8 | 37 |
| 6 D | 2− | 2o | 1+ | 3+ | 4+ | 5o | 5− | 4+ | 27− | 1.2 | 1.1 | 23 | 2323 3334 | 23 | 35 |
| 7 | 3+ | 2+ | 1+ | 1+ | 2− | 1− | 1+ | 2o | 14o | 0.4 | 0.4 | 7 | 4312 1123 | 17 | 31 |
| 8 | 2+ | 2o | 1o | 0+ | 1o | 1o | 1− | 3− | 11o | 0.2 | 0.3 | 6 | 2211 2213 | 14 | 33 |
| 9 q | 1+ | 1+ | 0o | 1o | 0o | 0+ | 0+ | 0o | 4+ | 0.0 | 0.0 | 2 | 1201 0110 | 6 | 32 |
| 10 | 2− | 2+ | 1+ | 2− | 1+ | 2+ | 0+ | 0+ | 11+ | 0.2 | 0.2 | 6 | 2322 1211 | 14 | 43 |
| 11 | 0+ | 2− | 1+ | 0+ | 3o | 3+ | 3o | 3− | 16− | 0.6 | 0.5 | 9 | 1220 3322 | 15 | 43 |
| 12 | 1o | 1− | 1+ | 1o | 0+ | 0+ | 1− | 1o | 6+ | 0.1 | 0.1 | 3 | 1121 0112 | 9 | 44 |
| 13 D | 1+ | 2+ | 2o | 2+ | 4o | 2o | 3− | 4o | 21− | 0.8 | 0.7 | 13 | 2322 3233 | 20 | 36 |
| 14 D | 3o | 4− | 3o | 3+ | 3o | 1+ | 3o | 3+ | 24− | 0.8 | 0.9 | 15 | 3433 3223 | 23 | 26 |
| 15 D | 3o | 3o | 3o | 2− | 3− | 4− | 4+ | 1− | 22o | 0.8 | 0.8 | 15 | 3332 3231 | 20 | 13 |
| 16 | 1o | 3o | 2+ | 3+ | 2− | 0+ | 2− | 2− | 15o | 0.4 | 0.4 | 8 | 2333 1133 | 19 | 18 |
| 17 q | 0+ | 1− | 1− | 1o | 1− | 1o | 1o | 1o | 6+ | 0.1 | 0.1 | 3 | 1121 1221 | 11 | 26 |
| 18 Q | 1− | 1o | 0+ | 0+ | 1o | 1− | 0o | 0+ | 4+ | 0.0 | 0.0 | 2 | 1101 1010 | 5 | 26 |
| 19 | 1− | 1+ | 4− | 3+ | 2o | 3+ | 1+ | 2− | 17+ | 0.6 | 0.6 | 10 | 2242 2332 | 20 | 26 |
| 20 | 2− | 2− | 1+ | 1+ | 1+ | 2o | 0+ | 0+ | 10o | 0.3 | 0.2 | 5 | 2212 1111 | 11 | 31 |
| 21 q | 1o | 0+ | 0+ | 0+ | 1+ | 0+ | 0+ | 1− | 5− | 0.0 | 0.0 | 3 | 1100 1001 | 4 | 45 |
| 22 q | 1o | 0+ | 0+ | 1o | 1+ | 1o | 0+ | 0+ | 6− | 0.0 | 0.1 | 3 | 1001 2111 | 7 | 59 |
| 23 Q | 0o | 1o | 1− | 1− | 1o | 0+ | 0+ | 0+ | 4+ | 0.0 | 0.0 | 2 | 0210 0010 | 4 | 62 |
| 24 Q | 1− | 1o | 0+ | 0+ | 0o | 0+ | 0+ | 0+ | 3+ | 0.0 | 0.0 | 2 | 1211 0012 | 8 | 52 |
| 25 Q | 0o | 0o | 0o | 0+ | 0+ | 0+ | 0+ | 1o | 2+ | 0.0 | 0.0 | 2 | 0000 0001 | 1 | 60 |
| 26 | 0+ | 1− | 1− | 1− | 1o | 1− | 1+ | 2+ | 8− | 0.1 | 0.1 | 4 | 1110 1123 | 10 | 57 |
| 27 | 2o | 3o | 3− | 2+ | 3o | 4− | 2o | 3− | 21+ | 0.8 | 0.7 | 12 | 2343 2333 | 23 | 54 |
| 28 | 1− | 1o | 1− | 2− | 2o | 2o | 3− | 2+ | 13o | 0.4 | 0.3 | 6 | 1312 2223 | 16 | 60 |
| 29 | 1+ | 2o | 2+ | 2− | 1+ | 1o | 1+ | 1o | 12o | 0.3 | 0.3 | 6 | 2332 2121 | 16 | 59 |
| 30 q | 0+ | 1o | 1o | 0+ | 1o | 0o | 1− | 1o | 5+ | 0.1 | 0.1 | 3 | 0211 1022 | 9 | 58 |
| 31 D | 0+ | 2o | 3+ | 5− | 5o | 4− | 3− | 4o | 26− | 1.1 | 1.1 | 22 | 1244 4233 | 23 | 46 |
| | | | | | | | | | Means | 0.36 | 0.34 | 7 | | | 41.8 |
| | | | | | | | | | No. of days | 31 | 31 | 31 | | | 31 |

[1] Five quiet days (Q), ten quiet days (Q or q), five disturbed days (D) selected by Committee on Characterization of Magnetic Disturbances, J. Veldkamp, Kon. Nederlandsch Meteorologisch Institut, DeBilt, Holland.

[2] Geomagnetic planetary 3-hr-range indices $K_p$ prepared by Committee on Characterization of Magnetic Disturbances, J. Bartels, Chairman, University, Göttingen, Germany.

[3] Preliminary magnetic character figures, $C_i$, prepared by J. Veldkamp.

[4] Magnetic character figures, $C_p$, prepared by J. Bartels.

[5] Average amplitudes $A_p$ (unit 2 $\gamma$), prepared by J. Bartels.

[6] Fredericksburg 3-hr-range indices $K$ ($K9$ = 500 $\gamma$); scale values of variometers in $\gamma$/mm: $D$ = 2.7; $H$ = 3.0; $Z$ = 2.5; prepared by Robert E. Gebhardt, Observer-in-Charge, Fredericksburg Magnetic Observatory, Corbin, Virginia.

[7] Provisional sunspot numbers (dependent on observations at Zurich Observatory and its stations at Locarno and Arosa) prepared by M. Waldmeier, Swiss Federal Observatory, Zurich, Switzerland.

# Geomagnetic and Solar Data

J. VIRGINIA LINCOLN, EDITOR

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## PRINCIPAL MAGNETIC STORMS

(Advance knowledge of the character of the records at some observatories as regards disturbances)

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Amplitudes[3]: D (6) | Amplitudes[3]: H (7) | Amplitudes[3]: Z (8) | C Figure, Degree of Activity[4] (9) | Maximal Activity on K Scale 0 to 9: Gr. Day (10) | Maximal Activity: Gr. 3-hr. Period (11) | Maximal Activity: K Index (12) | Ranges: D (13) | Ranges: H (14) | Ranges: Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| College | Apr. 5 | 21 54 | 9 18 | ..... | ..... | ..... | ..... | s | 7 | 4 | 8 | 339 | 1710 | 1040 |
| (K. Cravens) | Apr. 10 | 02 .. | 12 05 | ..... | ..... | ..... | ..... | ms | 10 | 4,5,6 | 6 | 130 | 1090 | 620 |
| | | | | | | | | | 11 | 4,5 | | | | |
| | Apr. 20 | 23 56 | 23 21 | s.c.* | +18 | +93 | +38 | ms | 21 | 6 | 6 | 188 | 1140 | 710 |
| | | | | | | | | | 22 | 3,4,6 | | | | |
| | May 6 | 10 .. | 7 06 | ..... | ..... | ..... | ..... | ms | 6 | 5,6 | 7 | 359 | 1420 | 880 |
| | May 31 | 04 .. | | | | | | | | | | | | |
| | June | | 1 17 | ..... | ..... | ..... | ..... | ms | 31 | 4 | 6 | 125 | 950 | 680 |
| | June 9 | 01 .. | 10 22 | ..... | ..... | ..... | ..... | m | 9 | 2 | 5 | 66 | 700 | 410 |
| | | | | | | | | | 10 | 3,4 | | | | |
| Sitka | Apr. 6 | 05 00 | 8 20 | ..... | ..... | ..... | ..... | s | 7 | 5 | 8 | 125 | 800 | 570 |
| (M. L. | Apr. 10 | 08 50 | 11 18 | ..... | ..... | ..... | ..... | ms | 10 | 5,6 | 6 | 60 | 320 | 340 |
| Cleven) | May 6 | 10 00 | 7 04 | ..... | ..... | ..... | ..... | ms | 6 | 5,6 | 6 | 57 | 480 | 490 |
| | May 31 | 06 30 | 31 18 | ..... | ..... | ..... | ..... | ms | 31 | 4 | 7 | 67 | 580 | 570 |
| | June | (None) | | | | | | | | | | | | |
| Witteven | Apr. 6 | 04 00 | 9 02 | ..... | ..... | ..... | ..... | ms | 8 | 6 | 7 | 35 | 265 | 105 |
| (D.v. | Apr. 10 | 08 00 | 11 24 | ..... | ..... | ..... | ..... | ms | 10 | 7 | 6 | 40 | 215 | 70 |
| Sabben) | Apr. 21 | 16 00 | 22 24 | ..... | ..... | ..... | ..... | m | 21 | 6,8 | | | | |
| | | | | | | | | | 22 | 1,6,8 | 5 | 25 | 180 | 80 |
| | May 6 | 09 00 | 6 24 | ..... | ..... | ..... | ..... | m | 6 | 6 | 5 | 25 | 125 | 115 |
| | May 31 | 05 00 | 31 24 | ..... | ..... | ..... | ..... | ms | 31 | 8 | 6 | 25 | 160 | 80 |
| | June 9 | 01 00 | 10 15 | ..... | ..... | ..... | ..... | m | 9 | 8 | 5 | 20 | 145 | 50 |
| | | | | | | | | | 10 | 1 | | | | |
| Fredericks- | Apr. 6 | 04 .. | 9 03 | ..... | ..... | ..... | ..... | m | 6 | 7 | 5 | 28 | 141 | 76 |
| burg | | | | | | | | | 7 | 1,2,3,4,8 | | | | |
| (R. E. | | | | | | | | | 8 | 1,6 | | | | |
| Gebhardt) | Apr. 10 | 08 .. | 12 04 | ..... | ..... | ..... | ..... | m | 11 | 1 | 5 | 21 | 111 | 68 |
| | Apr. 21 | 15 .. | 23 17 | ..... | ..... | ..... | ..... | m | 22 | 2 | 5 | 28 | 101 | 49 |
| | May | (None) | | | | | | | | | | | | |
| | June | (None) | | | | | | | | | | | | |
| Tucson | Apr. 6 | 04 .. | 9 02 | ..... | ..... | ..... | ..... | ms | 7 | 3 | 6 | 16 | 112 | 41 |
| (C. J. Beers) | Apr. 10 | 08 .. | 12 03 | ..... | ..... | ..... | ..... | m | 11 | 1 | 5 | 13 | 86 | 32 |
| | Apr. 20 | 23 56 | 23 12 | s.c. | −2 | +39 | +4 | m | 21 | 6 | 5 | 15 | 118 | 44 |
| | | | | | | | | | 22 | 3 | | | | |
| | May 6 | 18 .. | 7 06 | ..... | ..... | ..... | ..... | m | 6 | 6,8 | 4 | 7 | 119 | 34 |
| | | | | | | | | | 7 | 1 | | | | |
| | May 27 | 04 14 | 28 20 | s.c. | −1 | +29 | +2 | m | 27 | 2,6 | 4 | 12 | 71 | 35 |
| | May 31 | 04 .. | 1 15 | ..... | ..... | ..... | ..... | m | 31 | 5 | 5 | 11 | 75 | 33 |
| | June 9 | 00 .. | 10 16 | ..... | ..... | ..... | ..... | m | 9 | 2,3,4,8 | 4 | 11 | 97 | 32 |
| | | | | | | | | | 10 | 3,4 | | | | |
| | June 27 | 00 .. | 28 00 | ..... | ..... | ..... | ..... | m | 27 | 2,3,5,8 | 4 | 11 | 60 | 29 |

[1] Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces; more specifically, when the K-index measure diminished to 2 or less for a reasonable period.

[2] s.c. = sudden commencement; s.c.* = small initial impulse followed by main impulse (the amplitude in this case is that of the main impulse only, neglecting the initial brief pulse); ... = gradual commencement.

[3] Signs of amplitudes of D and Z taken algebraically; D reckoned positive if toward the east and Z reckoned positive if vertically downward.

[4] Storm described by three degrees of activity: m for moderate (when K index is as great as 5), ms for moderately severe (when K = 6 or 7), s for severe (when K = 8 or 9).



5

PRINCIPAL MAGNETIC STORMS, Continued

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Amplitudes[3] D (6) | Amplitudes[3] H (7) | Amplitudes[3] Z (8) | C Figure, Degree of Activity[4] (9) | Maximal Activity on K Scale 0 to 9: Gr. Day (10) | Gr. 3-hr. Period (11) | K Index (12) | Ranges D (13) | Ranges H (14) | Ranges Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| San Juan (M. Vazquez) | Apr. | No Storms | | | | | | | | | | | | |
| | May | No Storms | | | | | | | | | | | | |
| | June | No Storms | | | | | | | | | | | | |
| Honolulu (C. D. Upham) | Apr. 2 | 16 00 | 3 11 | ..... | ..... | ..... | ..... | m | 2<br>3 | 8<br>3 | 4 | 8 | 53 | 29 |
| | Apr. 6 | 04 00 | 9 03 | ..... | ..... | ..... | ..... | m | 7 | 1,3,4 | 5 | 11 | 94 | 38 |
| | Apr. 10 | 08 00 | 12 04 | ..... | ..... | ..... | ..... | m | 11<br>12 | 1,4<br>1 | 4 | 6 | 56 | 26 |
| | Apr. 15 | 13 00 | 16 04 | ..... | ..... | ..... | ..... | m | 15 | 5 | 4 | 7 | 51 | 24 |
| | Apr. 20 | 23 55 | 22 18 | s.c.* | −1* | +25 | +9 | m | 20<br>21 | 8<br>7 | 4 | 6 | 114 | 38 |
| | May 5 | 18 00 | ..... | ..... | ..... | ..... | ..... | m | 5 | 8 | 4 | | | |
| | May 6 | 09 52 | 7 04 | s.c. | +0 | −14 | −3 | | 6 | 6 | 4 | 9 | 114 | 27 |
| | May 27 | 04 14 | 27 20 | s.c. | −1 | +15 | +5 | m | 27 | 2 | 4 | 6 | 50 | 19 |
| | May 31 | 05 00 | 1 12 | ..... | ..... | ..... | ..... | m | 31 | 2,3,4 | 4 | 11 | 57 | 32 |
| | June 9 | 00 55 | 10 16 | s.c. | ..... | +3 | +2 | m | 9 | 2 | 5 | 8 | 69 | 24 |
| | June 26 | 08 51 | 28 17 | s.c. | −0 | +8 | +2 | m | 27 | 3,6 | 4 | 10 | 87 | 37 |
| Huancayo (A. Giesecke and M. Casaverde) | Apr. 10 | 11 00 | 10 23 | ..... | ..... | ..... | ..... | m | 10 | 5,6 | 5 | 4 | 170 | 40 |
| | Apr. 20 | 23 56 | 21 22 | s.c. | 0 | 36 | +7 | ms | 21 | 6 | 6 | 5 | 364 | 27 |
| | May | No Storms | | | | | | | | | | | | |
| | June | No Storms | | | | | | | | | | | | |
| Port Moresby (J. A. Brooks) | Apr. | No Storms | | | | | | | | | | | | |
| | May | No Storms | | | | | | | | | | | | |
| | June | No Storms | | | | | | | | | | | | |
| Apia (J. G. Keys) | Apr. 5 | 19 .. | 9 03 | ..... | ..... | ..... | ..... | m | 6 | 3,4 | 5 | 4 | 152 | 29 |
| | May | No Storms | | | | | | | | | | | | |
| | June 6 | 20 00 | 7 13 | ..... | ..... | ..... | ..... | m | 7 | 3 | 5 | 3 | 56 | 14 |
| Hermanus (A. M. van Wijk) | Apr. 6 | 00 .. | 9 03 | bays | ..... | ..... | ..... | m | 7<br>8 | 6,7,8<br>6,7 | 5 | 25 | 118 | 119 |
| | Apr. 10 | 03 .. | 11 04 | bays | ..... | ..... | ..... | m | 10 | 5,7,8 | 5 | 18 | 85 | 88 |
| | Apr. 20 | 23 56 | 23 05 | s.c. | +2 | +26 | | m | 21 | 7 | 5 | 16 | 106 | 113 |
| | May 5 | 18 .. | 7 05 | bays | ..... | ..... | ..... | m | 6 | 5,6 | 5 | 15 | 145 | 90 |
| | May 31 | 04 .. | 1 05 | bays | ..... | ..... | ..... | m | 31 | 4 | 5 | 16 | 105 | 47 |
| Gnangara (P. M. McGregor) | Apr. 6 | 03 .. | 8 20 | ..... | ..... | ..... | ..... | ms | 7 | 5 | 6 | 19 | 107 | 132 |
| | Apr. 10 | 09 .. | 11 19 | ..... | ..... | ..... | ..... | ms | 10 | 5 | 6 | 17 | 106 | 82 |
| | Apr. 20 | 23 56 | 22 22 | s.c.* | 4* | 13 | 16* | m | 21 | 6 | 5 | 17 | 105 | 97 |
| | May 5 | 19 .. | 7 02 | ..... | ..... | ..... | ..... | m | 6 | 6,7,8 | 5 | 14 | 112 | 96 |
| | May 31 | 04 .. | | ..... | ..... | ..... | ..... | ms | 31 | 4 | 6 | 18 | 96 | 111 |
| | June | | 1 15 | | | | | | | | | | | |
| | | Note: No record May 1st: 2000–2335. | | | | | | | | | | | | |
| | June | No Storms | | | | | | | | | | | | |
| Amberley (A. L. Cullington) | Apr. 7 | 01 00 | 9 00 | gradual | ... | ..... | ..... | m | 7 | 1,2,3,4 | 5 | 21 | 139 | 76 |
| | Apr. 10 | 09 00 | 11 18 | gradual | ... | ..... | ..... | m | 10 | 5 | 5 | 20 | 87 | 48 |
| | Apr. 20 | 23 57 | .. .. | s.c.* | −2 | +49 | −12 | | | | | | | |
| | May | No Storms | | | | | | | | | | | | |
| | June | No Storms | | | | | | | | | | | | |

## SELECTED GEOMAGNETIC AND SOLAR DATA

$K_p$, $C_s$, $C_p$, $A_p$, $K_{Fr}$, $R_z$, and Selected Days, June 1962

| Day[1] | 3-hr Range Indices $K_p$[2] 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Prel.[3] $C_s$ | $C_p$[4] | $A_p$[5] | 3-hr Range Indices $K_{Fr}$[6] Values | Sum | Prov.[7] $R_z$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3− | 2o | 3o | 3− | 2o | 1o | 2o | 2o | 17+ | 0.7 | 0.5 | 9 | 3343 2122 | 20 | 34 |
| 2 q | 1+ | 1+ | 1− | 2− | 1− | 1− | 2− | 2− | 10− | 0.2 | 0.2 | 5 | 2211 0122 | 11 | 30 |
| 3 q | 1− | 0o | 0+ | 1− | 2− | 2− | 1+ | 3− | 9o | 0.3 | 0.2 | 5 | 1000 1222 | 8 | 25 |
| 4 | 4− | 2o | 2+ | 3− | 2+ | 3− | 3o | 3+ | 22o | 1.0 | 0.7 | 13 | 3233 2233 | 21 | 21 |
| 5 | 2o | 1+ | 2+ | 2o | 1o | 2− | 3+ | 4− | 17+ | 0.8 | 0.5 | 10 | 2233 1234 | 20 | 23 |
| 6 | 3+ | 2+ | 3+ | 2− | 1+ | 1+ | 2+ | 2+ | 18o | 0.7 | 0.6 | 10 | 3331 1133 | 18 | 33 |
| 7 | 1+ | 2o | 4− | 3− | 2o | 2− | 2o | 1− | 16o | 0.8 | 0.5 | 9 | 2343 2121 | 18 | 32 |
| 8 Q | 0o | 1− | 1+ | 1− | 1− | 1− | 1o | 1o | 6o | 0.1 | 0.1 | 3 | 0121 0111 | 7 | 32 |
| 9 D | 3− | 4o | 3+ | 4− | 4− | 3− | 4o | 5− | 29− | 1.2 | 1.1 | 22 | 3434 3344 | 28 | 46 |
| 10 D | 5− | 4− | 3+ | 4o | 3o | 2− | 2o | 1o | 23+ | 1.0 | 0.9 | 17 | 4434 2222 | 23 | 41 |
| 11 q | 1o | 2o | 2o | 1+ | 2− | 1− | 1+ | 2o | 12o | 0.3 | 0.2 | 6 | 2332 2113 | 17 | 40 |
| 12 | 2+ | 1− | 2+ | 2+ | 3− | 2o | 2o | 1o | 15+ | 0.4 | 0.4 | 8 | 3132 2222 | 17 | 39 |
| 13 q | 1+ | 1+ | 2+ | 2− | 1− | 1− | 1o | 1− | 10− | 0.2 | 0.2 | 5 | 1231 0121 | 11 | 39 |
| 14 | 1o | 3− | 2− | 2− | 2− | 1+ | 2+ | 3o | 15+ | 0.3 | 0.4 | 8 | 1322 2133 | 17 | 40 |
| 15 | 3− | 3+ | 2o | 2o | 3o | 3− | 3o | 1o | 20− | 0.8 | 0.6 | 11 | 3421 2232 | 19 | 59 |
| 16 q | 3+ | 1o | 1o | 1o | 1+ | 1+ | 1o | 1− | 11− | 0.3 | 0.3 | 6 | 3112 1121 | 12 | 58 |
| 17 Q | 0+ | 0o | 0o | 0+ | 0+ | 1− | 1− | 1− | 3o | 0.0 | 0.0 | 2 | 1000 0121 | 5 | 70 |
| 18 Q | 2− | 1− | 0+ | 0+ | 0+ | 0+ | 0+ | 0o | 4o | 0.1 | 0.0 | 2 | 2210 0111 | 8 | 68 |
| 19 Q | 1− | 1o | 1o | 1− | 2o | 2− | 1+ | 1o | 9+ | 0.2 | 0.2 | 4 | 1201 1122 | 10 | 62 |
| 20 Q | 1+ | 1o | 1+ | 1o | 1− | 1− | 1o | 1o | 8o | 0.2 | 0.1 | 4 | 2122 1112 | 12 | 44 |
| 21 | 1o | 1o | 0+ | 3o | 3o | 4− | 4o | 2+ | 18+ | 0.7 | 0.7 | 12 | 2202 1243 | 16 | 35 |
| 22 | 3− | 4− | 3− | 2− | 1+ | 1+ | 3− | 2o | 18o | 0.6 | 0.6 | 10 | 3421 1132 | 17 | 46 |
| 23 D | 3− | 2+ | 3+ | 3− | 2+ | 3o | 4+ | 3− | 23+ | 1.0 | 0.8 | 15 | 3433 2333 | 24 | 38 |
| 24 | 2o | 1+ | 2o | 2− | 1+ | 2− | 2o | 2o | 14o | 0.4 | 0.3 | 6 | 2122 2132 | 15 | 30 |
| 25 | 2o | 2+ | 3− | 1+ | 1+ | 1− | 1+ | 1o | 13− | 0.3 | 0.3 | 6 | 2331 1012 | 13 | 43 |
| 26 | 1− | 1− | 2o | 1+ | 1+ | 2+ | 2+ | 3o | 14− | 0.4 | 0.4 | 7 | 1121 1234 | 15 | 46 |
| 27 D | 3o | 3+ | 4− | 3o | 4o | 3− | 4o | 3+ | 27o | 1.1 | 1.0 | 19 | 3443 4344 | 29 | 36 |
| 28 D | 3− | 3− | 3+ | 4− | 4− | 2o | 3− | 4+ | 25o | 1.2 | 0.9 | 17 | 3334 3234 | 25 | 44 |
| 29 | 3o | 3+ | 3o | 3− | 3+ | 2+ | 3− | 3− | 23o | 0.8 | 0.8 | 14 | 4433 3333 | 26 | 44 |
| 30 | 2+ | 4− | 3+ | 3o | 2o | 4− | 2− | 2−. | 21+ | 0.9 | 0.8 | 13 | 2133 2332 | 22 | 49 |
| | | | | | | | | | Means | 0.57 | 0.48 | 9 | | | 41.6 |
| | | | | | | | | | No. of days | 30 | 30 | 30 | | | 30 |

[1] Five quiet days (Q), ten quiet days (Q or q), five disturbed days (D) selected by Committee on Characterization of Magnetic Disturbances, J. Veldkamp, Kon. Nederlandsch Meteorologisch Institut, DeBilt, Holland.

[2] Geomagnetic planetary 3-hr-range indices $K_p$ prepared by Committee on Characterization of Magnetic Disturbances, J. Bartels, Chairman, University, Göttingen, Germany.

[3] Preliminary magnetic character figures, $C_s$, prepared by J. Veldkamp.

[4] Magnetic character figures, $C_p$, prepared by J. Bartels.

[5] Average amplitudes $A_p$ (unit 2 γ), prepared by J. Bartels.

[6] Fredericksburg 3-hr-range indices $K$ ($K9$ = 500 γ); scale values of variometers in γ/mm: $D$ = 2.7, $H$ = 2.5, $Z$ = 2.9; prepared by Robert E. Gebhardt, Observer-in-Charge, Fredericksburg Magnetic Observatory, Corbin, Virginia.

[7] Provisional sunspot numbers (dependent on observations at Zurich Observatory and its stations at Locarno and Arosa) prepared by M. Waldmeier, Swiss Federal Observatory, Zurich, Switzerland.

# Geomagnetic and Solar Data

J. VIRGINIA LINCOLN, EDITOR

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## PRINCIPAL MAGNETIC STORMS

(Advance knowledge of the character of the records at some observatories as regards disturbances)

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Amplitudes[3]: D (6) | Amplitudes[3]: H (7) | Amplitudes[3]: Z (8) | C Figure, Degree of Activity[4] (9) | Maximal Activity on K Scale 0 to 9: Gr. Day (10) | Gr. 3-hr Period (11) | K Index (12) | Ranges: D (13) | Ranges: H (14) | Ranges: Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| Toolangi (C. A. van der Waal) | Apr. 6 | 04 00 | 8 21 | ..... | ..... | ..... | ..... | ms | 8 | 6 | 6 | 24 | 124 | 66 |
| | May | | No storms | | | | | | | | | | | |
| | June | | No storms | | | | | | | | | | | |
| Alibag (A. S. Chaubal) | Jan. 10 | 02 12 | 11 02 | s.c. | −1 | +22 | −9 | s | 10 | 4 | 8 | 6 | 282 | 32 |
| | Jan. 19 | 01 14 | 19 20 | s.c. | 0 | +14 | −5 | m | 19 | 5,6 | 5 | 3 | 124 | 15 |
| | Feb. 4 | 09 29 | 5 04 | s.c. | ..... | +15 | −2 | ms | 4 | 5 | 7 | 3 | 226 | 26 |
| | Sudden impulse at 03h 15m GMT on Feb 5; $H$ = −34γ, $Z$ = 15γ, $D$ = +0′.7 | | | | | | | | | | | | | |
| | Feb. 14 | 17 .. | 16 22 | ..... | ..... | ..... | ..... | ms | 16 | 4 | 6 | 4 | 237 | 39 |
| | Feb. 26 | 08 30 | 27 22 | ..... | ..... | ..... | ..... | ms | 25 | 5 | 6 | 4 | 156 | 22 |
| | Sudden impulse at 12h 34m GMT on Feb. 26; $H$ = Lost, $Z$ = −5, $D$ = −0′.3 | | | | | | | | | | | | | |
| Annamalainagar (P. Sundaresan) | Jan. 10 | 02 12 | 11 02 | s.c. | −1 | +33 | +17 | s | | | | 6 | 103 | 109 |
| | Jan. 19 | 01 14 | 19 20 | s.c. | −1 | +20 | +11 | m | | | | 3 | 245 | 46 |
| | Feb. 4 | 09 29 | 5 04 | s.c. | −1 | +23 | +9 | ms | | | | 5 | 27 | 64 |
| | Sudden impulse at 03h 15m GMT on Feb. 5; $H$ = −101γ, $Z$ = −27γ, $D$ = −2′.6 | | | | | | | | | | | | | |
| | Feb. 14 | 17 .. | 16 22 | ..... | ..... | ..... | ..... | ms | | | | 4 | 260 | 93 |
| | Feb. 26 | 08 30 | 27 22 | ..... | ..... | ..... | ..... | ms | | | | 3 | 183 | 45 |
| | Sudden impulse at 12h 34m GMT on Feb. 26, $H$ = +30γ, $Z$ = +16γ, $D$ = −0′.7 | | | | | | | | | | | | | |
| Trivandrum (Y. H. Subrahmanian) | Jan. 10 | 02 12 | 11 02 | s.c. | 0 | +29 | +33 | s | | | | 5 | 315 | 213 |
| | Jan. 19 | 01 14 | 19 20 | s.c. | 0 | +14 | +17 | m | | | | 2 | 159 | 76 |
| | Feb. 4 | Record lost | | | | | | | | | | | | |
| | Sudden impulse at 03h 15m GMT on Feb. 5; $H$ = −116γ, $Z$ = −124γ, $D$ = +1′.0 | | | | | | | | | | | | | |
| | Feb. 14 | 17 .. | 16 22 | ..... | ..... | ..... | ..... | ms | | | | 3 | 251 | 146 |
| | Feb. 26 | 08 30 | 27 22 | ..... | ..... | ..... | ..... | ms | | | | 3 | 190 | 187 |
| | Sudden impulse at 12h 34m GMT on Feb. 26; $H$ = +26γ, $Z$ = +33γ, $D$ = Negligible | | | | | | | | | | | | | |
| | *1961* | | | | | | | | | | | | | |
| Wilkes (W. M. Burch) | Feb. 4 | 18 29 | 5 09 | s.c.* | −30 | ..... | −85 | m | 5 | 1,2,3 | 5 | 250 | 600 | 550 |
| | Jul. 13 | 10 .. | 15 05 | ..... | ..... | ..... | ..... | ms | 13 | 5 | 7 | 250 | 790 | 1040 |
| | Jul. 26 | 19 39 | 28 07 | s.c.* | −30* | +30* | −60* | ms | 27 | 8 | 6 | 290 | 800 | 970 |
| | Sep. 30 | 21 09 | 1 13 | s.c.* | −45* | +170* | −105* | ms | 30 | 8 | 7 | 540 | 1240 | 1310 |
| | | | | | | | | | 1 | 2 | | | | |
| | Oct. 28 | 08 09 | 29 11 | s.c.* | +76* | ..... | +72* | m | 28 | 8 | 5 | 370 | 1070 | 700 |
| | | | | | | | | | 29 | 1,2,3 | | | | |
| | Nov. 17 | 22 .. | 19 12 | ..... | ..... | ..... | ..... | m | 18 | 2,3,4,5 | 5 | 300 | 800 | 820 |
| | Dec. 1 | 04 .. | 4 09 | ..... | ..... | ..... | ..... | ms | 2 | 2 | 7 | 450 | 890 | 1000 |
| | Dec. 28 | 01 .. | 30 10 | ..... | ..... | ..... | ..... | ms | 28 | 2 | 6 | 410 | 860 | 440 |
| | *1961* | | | | | | | | | | | | | |
| Mawson (R. J. S. Hollingsworth) | Feb. 4 | 13 .. | 5 11 | ..... | ..... | ..... | ..... | ms | 4 | 7,8 | 7 | 165 | 950 | 800 |
| | Feb. 12 | 21 45 | 13 21 | ..... | ..... | ..... | ..... | m | 13 | 4,5 | 6 | 94 | 770 | 1030 |
| | Feb. 15 | 23 35 | 17 05 | ..... | ..... | ..... | ..... | m | 16 | 4 | 6 | 53 | 520 | 430 |
| | Feb. 17 | 08 .. | 19 17 | ..... | ..... | ..... | ..... | ms | 17 | 8 | 7 | 150 | 1040 | 1290 |
| | | | | | | | | | 18 | 1,6 | 7 | | | |

[1] Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces; more specifically, when the K-index measure diminished to 2 or less for a reasonable period.

[2] s.c. = sudden commencement; s.c.* = small initial impulse followed by main impulse (the amplitude in this case is that of the main impulse only, neglecting the initial brief pulse); = gradual commencement.

[3] Signs of amplitudes of $D$ and $Z$ taken algebraically; $D$ reckoned positive if toward the east and $Z$ reckoned positive if vertically downward.

[4] Storm described by three degrees of activity: m for moderate (when K index as great as 5); ms for moderately severe (when K = 6 or 7); s for severe (when K = 8 or 9).



8

PRINCIPAL MAGNETIC STORMS (Continued)

(Advance knowledge of the character of the records at some observatories as regards disturbances)

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Amplitudes[3]: D (6) | Amplitudes[3]: H (7) | Amplitudes[3]: Z (8) | C Figure, Degree of Activity[4] (9) | Maximal activity on K Scale 0 to 9: Gr. Day (10) | Gr. 3-hr Period (11) | K Index (12) | Ranges: D (13) | Ranges: H (14) | Ranges: Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1961* | h m | d h | | ′ | γ | γ | | | | | ′ | γ | γ |
| | Mar. 9 | 13 27 | 10 21 | s.c.* | −8 | −47 | +50 | m | 10 | 3 | 7 | 110 | 650 | 615 |
| | Apr. 14 | 03 .. | 15 09 | ..... | ..... | ..... | ..... | ms | 15 | 1 | 8 | 200 | 870 | 1190 |
| | May 12 | 23 19 | 14 13 | s.c. | 8 | 140 | 100 | m | 14 | 1,2 | 6 | 70 | 610 | 560 |
| | June 20 | 19 37 | 23 04 | s.c. | −18 | −190 | +180 | ms | 22 | 2 | 8 | 180 | 1060 | 1030 |
| | Jul. 4 | 20 25 | 6 14 | ..... | ..... | ..... | ..... | m | 4 | 8 | 7 | 145 | 870 | 1000 |
| | | | | | | | | | 5 | 1,2 | | | | |
| | Jul. 13 | 11 13 | 16 09 | s.c.* | (−64) | −660 | (+150) | s | 14 | 7 | 8 | 198 | 1820 | 1180 |
| | Jul. 17 | 18 30 | 19 06 | ..... | ..... | ..... | ..... | ms | 17 | 8 | 7 | 150 | 940 | 1360 |
| | | | | | | | | | 18 | 2,3,6,7,8 | 7 | | | |
| | Jul. 20 | 19(42) | 22 16 | s.c.* | (−95) | −155 | +235 | ms | 21 | 1,2 | 7 | 146 | 1050 | 920 |
| | Jul. 26 | 19 51 | 28 13 | s.c.* | +130 | −215 | +168 | ms | 27 | 7,8 | 7 | 206 | 1130 | 1140 |
| | Aug. 1 | 21 11 | 3 12 | s.c.* | −18 | −70 | +75 | m | 2 | 1,4 | 7 | 70 | 1020 | 715 |
| | Aug. 30 | 21 14 | | s.c.* | +20 | (−170) | −260 | m | 31 | 1,8 | 7 | 144 | 950 | 1250 |
| | Sep. | | 1(12) | | | | | | | | | | | |
| | Sep. 24 | 10(50) | 25 17 | ..... | ..... | ..... | ..... | m | 24 | 6 | 7 | 102 | 790 | 640 |
| | | | | | | | | | 25 | 2 | | | | |
| | Sep. 30 | 20 56 | | s.c.* | −84 | −510 | −350 | s | 30 | 8 | 9 | 227 | 2160 | 1060 |
| | Oct. | | 1 16 | | | | | | | | | | | |
| | Oct. 28 | 08 10 | 29 09 | s.c.* | +26 | +310 | −240 | ms | 28 | 7 | 8 | 365 | 1640 | 1350 |
| | Nov. 6 | 23 20 | 8 15 | ..... | ..... | ..... | ..... | ms | 7 | 6,7 | 7 | 250 | 1020 | 1250 |
| | | | | | | | | | 8 | 1 | 7 | | | |
| | Nov. 17 | 13 28 | 19 08 | ..... | ..... | ..... | ..... | ms | 18 | 6 | 8 | 134 | 1200 | 860 |
| | Dec. 1 | 06 .. | 4 06 | ..... | ..... | ..... | ..... | s | 3 | 2 | 8 | 212 | 1490 | 1540 |
| | *1962* | | | | | | | | | | | | | |
| | Jan. 10 | 01 46 | 11 10 | ..... | ..... | ..... | ..... | m | 10 | 2,3,4,5 | 6 | 94 | 670 | 780 |
| | *1960* | | | | | | | | | | | | | |
| Mawson (R. W. Merrick) | Feb. | | | No storms | | | | | | | | | | |
| | Mar. 30 | 15 22 | | ..... | ..... | ..... | ..... | s | 31 | 5,8 | 8 | 200 | 2200 | 1800 |
| | Apr. | | 2 12 | | | | | | 1 | 1,2,7 | | | | |
| | Apr. 10 | 01 28 | 13 10 | s.c. | −2 | +20 | −8 | ms | 12 | 1,8 | 8 | 107 | 750 | 650 |
| | | | | | | | | | 13 | 3 | | | | |
| | Apr. 23 | 17 .. | 27 02 | ..... | ..... | ..... | ..... | ms | 24 | 8 | 7 | 118 | 1060 | 700 |
| | | | | | | | | | 25 | 1,6 | | | | |
| | Apr. 27 | 19 .. | | ..... | ..... | ..... | ..... | s | 30 | 5,6 | 8 | 250 | 1900 | 1300 |
| | May | | 1 13 | | | | | | | | | | | |
| | May 5 | 20 02 | 9 06 | s.c. | +2 | −20 | ..... | s | 6 | 7,8 | 8 | >180 | >1900 | >1100 |
| | | | | | | | | | 8 | 2,4 | | | | |
| | May 23 | 14 22 | 27 09 | s.c. | −4 | −20 | −25 | ms | 24 | 7 | 7 | 115 | 700 | 600 |
| | | | | | | | | | 26 | 8 | | | | |
| | June 3 | 17 .. | 6 13 | ..... | ..... | ..... | ..... | ms | 4 | 2 | 7 | 137 | 790 | 600 |
| | | | | | | | | | 6 | 2 | | | | |
| | June 24 | 19 37 | 29 09 | s.c. | +26 | −38 | ..... | s | 27 | 1 | 8 | 115 | 1100 | 900 |
| | Jul. 15 | 18 .. | 17 11 | ..... | ..... | ..... | ..... | s | 16 | 1 | 9 | 160 | 1600 | 1000 |
| | Jul. 30 | 19 06 | | s.c. | −6 | ..... | −85 | ms | 31 | 1,8 | 7 | 145 | 900 | 600 |
| | Aug. | | 1 08 | | | | | | | | | | | |
| | Aug. 16 | 14 09 | 18 11 | s.c.* | +10* | −50* | −100* | s | 17 | 1 | 9 | >170 | 1500 | 1000 |
| | Aug. 29 | 19 08 | 31 07 | s.c. | −3 | −94 | +30 | s | 30 | 2 | 8 | 130 | 1200 | >900 |
| | Sep. 4 | 00 32 | 6 12 | s.c. | −2 | −38 | −30 | s | 4 | 7 | 8 | 140 | 1700 | 1400 |
| | | | | | | | | | 5 | 1,7 | | | | |
| | Sep. 29 | 18 50 | | s.c. | −5 | ..... | ..... | ms | 1 | 8 | 7 | 190 | 1000 | 750 |
| | Oct. | | 2 19 | | | | | | | | | | | |
| | Oct. 4 | 14 00 | 10 06 | s.c. | −8 | −9 | +30 | s | 6 | 8 | 9 | 170 | 1650 | 1500 |
| | Oct. 24 | 14 52 | 31 24 | s.c.* | +17* | −50* | −30* | ms | 25 | 6,7 | 7 | 170 | 1200 | 1000 |
| | | | | | | | | | 26 | 3 | | | | |
| | | | | | | | | | 28 | 1,2,3,7 | | | | |
| | | | | | | | | | 29 | 1 | | | | |
| | Nov. 3 | 20 05 | 5 07 | s.c.* | −8* | −170* | −150* | ms | 4 | 4 | 7 | 120 | 750 | 950 |
| | Nov. 12 | 13 50 | 18 08 | s.c.* | −8* | −40* | −50* | s | 13 | 2 | 9 | >170 | >2000 | >2000 |
| | Nov. 21 | 00 23 | 23 09 | s.c.* | −9* | ..... | −120* | s | 21 | 3 | 8 | 120 | 950 | 800 |
| | Nov. 24 | 22 45 | 28 15 | ..... | ..... | ..... | ..... | ms | 25 | 2 | 7 | 190 | 900 | 1050 |
| | Nov. 30 | 18 40 | .. .. | s.c. | −8 | +45 | −40 | s | 1 | 2 | 8 | 160 | 1400 | 1300 |
| | Dec. | | 2 24 | | | | | | | | | | | |
| | Dec. 27 | 03 00 | 27 12 | s.c. | −6 | +23 | +45 | s | 27 | 6 | 8 | 130 | 1400 | 1000 |

$K_p$, $C_i$, $C_p$, $A_p$, $K_{F_r}$, $R_z$ and Selected Days, July 1962

| Day[1] | 3-hr Range Indices $K_p$[2] 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Prel.[3] $C_i$ | $C_p$[4] | $A_p$[5] | 3-hr Range Indices $K_{F_r}$[6] Values | Sum | Prov.[7] $R_z$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2o | 3− | 3o | 2+ | 2+ | 2− | 2o | 18o | 0.6 | 0.5 | 9 | 2333 2222 | 19 | 54 |
| 2 q | 2+ | 1o | 2o | 2o | 1− | 2− | 3− | 3o | 15+ | 0.5 | 0.4 | 8 | 2122 1223 | 15 | 39 |
| 3 q | 3− | 1o | 2− | 2o | 2o | 3− | 2+ | 1+ | 16− | 0.5 | 0.4 | 8 | 3131 2232 | 17 | 38 |
| 4 D | 2o | 4− | 3o | 2+ | 3+ | 2o | 4+ | 5− | 25+ | 1.2 | 1.0 | 19 | 3432 3234 | 24 | 30 |
| 5 D | 3o | 4o | 4o | 3o | 2+ | 2+ | 3+ | 2+ | 24+ | 1.0 | 0.9 | 16 | 3543 2233 | 25 | 26 |
| 6 | 3+ | 3o | 3− | 4− | 2o | 2− | 2+ | 2o | 21− | 0.8 | 0.7 | 12 | 4433 2132 | 22 | 20 |
| 7 | 1o | 1− | 1− | 2+ | 2− | 2+ | 3o | 3+ | 15o | 0.5 | 0.5 | 8 | 1113 2233 | 16 | 21 |
| 8 | 2o | 3o | 3o | 2+ | 2o | 2o | 2+ | 3o | 20− | 0.7 | 0.6 | 10 | 3431 2233 | 21 | 16 |
| 9 Q | 2+ | 2o | 2o | 1+ | 1− | 1− | 1+ | 2− | 12o | 0.3 | 0.3 | 6 | 2331 2122 | 16 | 10 |
| 10 | 2o | 1o | 1+ | 0+ | 3o | 3+ | 2o | 2o | 15o | 0.5 | 0.4 | 8 | 2210 2222 | 13 | 13 |
| 11 | 2o | 2− | 3− | 2o | 3− | 2+ | 3− | 2+ | 18+ | 0.6 | 0.5 | 9 | 2233 2233 | 20 | 19 |
| 12 q | 1o | 3o | 2+ | 2o | 2o | 2o | 1+ | 1+ | 15o | 0.5 | 0.4 | 7 | 1432 2222 | 18 | 11 |
| 13 | 3o | 1+ | 2− | 1+ | 3− | 3− | 3o | 3o | 19− | 0.6 | 0.6 | 11 | 3121 2233 | 17 | 29 |
| 14 | 3o | 3− | 3− | 2− | 2− | 2+ | 1o | 2o | 17o | 0.7 | 0.5 | 9 | 3332 1222 | 18 | 33 |
| 15 q | 3o | 1o | 1− | 1− | 1− | 1+ | 2o | 2o | 11+ | 0.3 | 0.3 | 6 | 3110 0222 | 11 | 21 |
| 16 Q | 2o | 1+ | 0+ | 0+ | 1o | 0+ | 0+ | 0o | 6− | 0.1 | 0.1 | 3 | 2211 1000 | 7 | 26 |
| 17 Q | 0+ | 0+ | 0+ | 0+ | 1− | 0+ | 0+ | 1o | 4− | 0.1 | 0.0 | 2 | 0101 0001 | 3 | 31 |
| 18 Q | 1+ | 1− | 1− | 1− | 1+ | 1− | 2o | 1o | 8+ | 0.2 | 0.1 | 4 | 1111 2022 | 10 | 29 |
| 19 | 1+ | 2+ | 2o | 3o | 2+ | 1+ | 3+ | 3− | 18+ | 0.8 | 0.6 | 10 | 2223 2233 | 19 | 8 |
| 20 | 3+ | 4o | 4o | 3− | 2+ | 3− | 3− | 2o | 24− | 1.0 | 0.9 | 16 | 3353 3333 | 26 | 14 |
| 21 | 3o | 3− | 2− | 3− | 2o | 3o | 3+ | 3o | 21+ | 0.8 | 0.7 | 12 | 3312 2343 | 21 | 23 |
| 22 q | 3o | 2o | 2+ | 2− | 1− | 1+ | 1+ | 2o | 14+ | 0.4 | 0.4 | 7 | 3331 0122 | 15 | 23 |
| 23 | 1o | 2+ | 3o | 2o | 1+ | 1o | 3+ | 2− | 16− | 0.6 | 0.5 | 8 | 1343 2131 | 18 | 17 |
| 24 | 2+ | 1o | 1o | 1− | 2o | 4+ | 5− | 4o | 20o | 1.0 | 0.9 | 16 | 3211 2344 | 20 | 13 |
| 25 | 5− | 4+ | 3+ | 2+ | 2− | 1− | 1o | 2+ | 20+ | 1.0 | 0.8 | 15 | 4433 2023 | 21 | 11 |
| 26 D | 3− | 6+ | 6− | 6− | 5o | 3+ | 4+ | 4+ | 37+ | 1.6 | 1.5 | 46 | 3654 4334 | 32 | 9 |
| 27 D | 5o | 4− | 3+ | 3− | 4o | 5+ | 3− | 4o | 31− | 1.4 | 1.2 | 28 | 5432 3334 | 27 | 9 |
| 28 D | 4− | 4− | 4o | 3− | 3o | 4− | 2+ | 3− | 26− | 1.1 | 1.0 | 18 | 4442 3332 | 25 | 9 |
| 29 | 4− | 2− | 3o | 2− | 1+ | 3− | 1+ | 2− | 17o | 0.7 | 0.5 | 10 | 4242 1222 | 19 | 8 |
| 30 Q | 2o | 3− | 2o | 0+ | 1− | 1− | 1− | 1+ | 10+ | 0.2 | 0.2 | 5 | 3320 1011 | 11 | 7 |
| 31 | 1− | 1− | 1+ | 1+ | 1− | 2o | 4+ | 4+ | 15+ | 0.9 | 0.6 | 11 | 1222 0244 | 17 | 0 |
| | | | | | | | | | Means | 0.68 | 0.58 | 12 | | | 19.7 |
| | | | | | | | | | No. of days | 31 | 31 | 31 | | | 31 |

[1] Five quiet days (Q), ten quiet days (Q or q), five disturbed days (D) selected by Committee on Characterization of Magnetic Disturbances, J. Veldkamp, Kon. Nederlandsch Meteorologisch Institut, DeBilt, Holland.

[2] Geomagnetic planetary 3-hr range indices $K_p$ prepared by Committee on Characterization of Magnetic Disturbances, J. Bartels, Chairman, University, Göttingen, Germany.

[3] Preliminary magnetic character figures, $C_i$, prepared by J. Veldkamp.

[4] Magnetic character figures, $C_p$, prepared by J. Bartels.

[5] Average amplitudes $A_p$ (unit 2 $\gamma$), prepared by J. Bartels.

[6] Fredericksburg 3-hr range indices $K$ ($K9 = 500\ \gamma$); scale values of variometers in $\gamma$/mm: $D = 2.7$; $H = 2.5$; $Z = 3.0$) prepared by Robert E. Gebhardt, Observer-in-Charge, Fredericksburg Magnetic Observatory, Corbin, Virginia.

[7] Provisional sunspot numbers (dependent on observations at Zurich Observatory and its stations at Locarno and Arosa) prepared by M. Waldmeier, Swiss Federal Observatory, Zurich, Switzerland.

# Geomagnetic and Solar Data

J. VIRGINIA LINCOLN, EDITOR

*National Bureau of Standards, Boulder, Colorado*

## PRINCIPAL MAGNETIC STORMS

(Advance knowledge of the character of the records at some observatories as regards disturbances)

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Sudden Commencement: Amplitudes[3] D (6) | Sudden Commencement: Amplitudes[3] H (7) | Sudden Commencement: Amplitudes[3] Z (8) | Figure, Degree of Activity[4] (9) | Maximal Activity on K Scale 0 to 9: Gr. Day (10) | Maximal Activity on K Scale 0 to 9: Gr. 3-hr Period (11) | Maximal Activity on K Scale 0 to 9: K Index (12) | Ranges: D (13) | Ranges: H (14) | Ranges: Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| Alibag | Apr. 20 | 23 56 | 22 23 | s.c. | −1 | +30 | −5 | m | 21 | 6 | 5 | 6 | 150 | 93 |
| (A. S. | May 4 | 22 .. | 6 23 | ..... | ..... | ..... | ..... | ms | 6 | 4 | 6 | 6 | 199 | 48 |
| Chaubal) | May 30 | 22 .. | | ..... | ..... | ..... | ..... | m | 31 | 4.5 | 5 | 5 | 177 | 54 |
| | June | | 1 19 | | | | | | | | | | | |
| Annamalai-nagar | Apr. 20 | 23 56 | 22 23 | s.c. | −1 | +33 | +18 | m | | | | 3 | 197 | 59 |
| (P. Sun-daresan) | May 30 | 22 .. | | ..... | ..... | ..... | ..... | m | | | | 4 | 210 | 53 |
| | June | | 1 19 | | | | | | | | | | | |
| Trivandrum | Apr. 20 | 23 56 | 22 23 | s.c. | +0 | +26 | +37 | m | | | | 2 | 225 | 94 |
| (Y. H. Sub-rahmanian) | May 4 | 22 .. | 6 23 | ..... | ..... | ..... | ..... | ms | | | | 3 | 284 | 100 |
| | May 30 | 22 .. | | ..... | ..... | ..... | ..... | m | | | | 4 | 220 | 86 |
| | June | | 1 19 | | | | | | | | | | | |

[1] Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces; more specifically, when the K-index measure diminished to 2 or less for a reasonable period.

[2] s.c. = sudden commencement; s.c.* = small initial impulse followed by main impulse (the amplitude in this case is that of the main impulse only, neglecting the initial brief pulse); ... = gradual commencement.

[3] Signs of amplitudes of D and Z taken algebraically; D reckoned positive if toward the east and Z reckoned positive if vertically downward.

[4] Storm described by three degrees of activity: m for moderate (when K index as great as 5); ms for moderately severe (when K = 6 or 7); s for severe (when K = 8 or 9).

## SELECTED GEOMAGNETIC AND SOLAR DATA

$K_p$, $C_i$, $C_p$, $A_p$, $K_{Fr}$, $R_z$, and Selected Days, August 1962

| Day[1] | 3-hr Range Indices $K_p$[2] 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Prel.[3] $C_i$ | $C_p$[4] | $A_p$[5] | 3-hr Range Indices $K_{Fr}$[6] Values | Sum | Prov.[7] $R_z$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 D | 5o | 5+ | 5− | 6o | 4− | 3o | 3o | 4o | 35− | 1.5 | 1.4 | 38 | 5556 3223 | 31 | 0 |
| 2 | 3+ | 3o | 1o | 2+ | 2+ | 2+ | 2+ | 2o | 19− | 0.8 | 0.6 | 10 | 3312 2212 | 16 | 7 |
| 3 | 2o | 3− | 3− | 2− | 3− | 3− | 3− | 3− | 20− | 0.8 | 0.6 | 11 | 2332 2223 | 19 | 7 |
| 4 q | 1o | 2o | 2+ | 2− | 2− | 2− | 2+ | 1+ | 14o | 0.4 | 0.3 | 6 | 1331 1121 | 13 | 10 |
| 5 q | 2o | 2o | 3− | 3o | 2o | 2− | 1+ | 1− | 15+ | 0.5 | 0.4 | 8 | 3243 2211 | 18 | 14 |
| 6 | 3o | 3+ | 4o | 3o | 4− | 3+ | 3− | 3+ | 26+ | 1.0 | 1.0 | 18 | 3453 3333 | 27 | 11 |
| 7 | 4o | 3o | 2+ | 2+ | 3o | 4− | 5− | 4+ | 27+ | 1.1 | 1.1 | 21 | 4322 3344 | 25 | 9 |
| 8 D | 5o | 4o | 5o | 4+ | 4o | 4o | 3− | 4+ | 33+ | 1.3 | 1.3 | 32 | 5554 3334 | 32 | 8 |
| 9 | 5− | 3+ | 4o | 3+ | 3o | 2+ | 3− | 3o | 26+ | 1.1 | 1.0 | 19 | 5343 3333 | 27 | 0 |
| 10 | 3o | 3− | 3+ | 2+ | 2+ | 3− | 1o | 1o | 18+ | 0.7 | 0.6 | 10 | 3342 2211 | 18 | 0 |
| 11 Q | 1o | 1− | 0+ | 0+ | 1− | 0+ | 1− | 0o | 4o | 0.0 | 0.0 | 2 | 2110 1021 | 08 | 0 |
| 12 Q | 0+ | 1o | 1− | 2− | 2− | 0+ | 0+ | 1o | 7o | 0.1 | 0.1 | 4 | 1212 2111 | 11 | 15 |
| 13 Q | 1− | 1− | 1o | 1+ | 1− | 0+ | 1o | 3+ | 9o | 0.3 | 0.2 | 5 | 0121 1033 | 11 | 24 |
| 14 | 2+ | 2+ | 1o | 2− | 2+ | 1o | 3o | 3+ | 17o | 0.7 | 0.5 | 9 | 3311 2234 | 19 | 40 |
| 15 | 3− | 5− | 5o | 3+ | 2o | 3− | 3− | 4o | 27o | 1.1 | 1.1 | 22 | 3453 2333 | 26 | 50 |
| 16 | 5o | 3+ | 4o | 1o | 1+ | 2− | 4− | 5− | 25− | 1.1 | 1.1 | 21 | 5351 2234 | 25 | 50 |
| 17 D | 4+ | 3+ | 3o | 3o | 3+ | 4− | 4− | 5o | 29+ | 1.2 | 1.1 | 24 | 4432 2334 | 25 | 53 |
| 18 | 3+ | 4+ | 5− | 3− | 3+ | 4− | 2+ | 3+ | 28− | 1.1 | 1.1 | 21 | 3542 3323 | 25 | 43 |
| 19 | 4+ | 4+ | 3+ | 3+ | 3− | 2+ | 2o | 2+ | 25− | 1.0 | 0.9 | 17 | 5543 2223 | 26 | 45 |
| 20 Q | 2− | 1− | 1o | 1+ | 2− | 1o | 1− | 2− | 10− | 0.2 | 0.2 | 5 | 2121 1112 | 11 | 39 |
| 21 q | 2o | 1− | 1− | 1o | 1o | 2− | 1+ | 4− | 12o | 0.4 | 0.3 | 7 | 2111 2234 | 16 | 36 |
| 22 D | 5+ | 4o | 5+ | 2+ | 3− | 3− | 5− | 5− | 32− | 1.4 | 1.3 | 31 | 5552 3344 | 31 | 30 |
| 23 | 4− | 3+ | 3o | 3+ | 3+ | 3+ | 3o | 3− | 26− | 1.0 | 0.9 | 17 | 4433 3333 | 26 | 27 |
| 24 | 3+ | 3o | 4+ | 3+ | 4+ | 3+ | 2+ | 4− | 28− | 1.1 | 1.0 | 20 | 4353 4324 | 28 | 30 |
| 25 | 4o | 3− | 3o | 2+ | 2o | 3− | 2o | 3+ | 22o | 0.9 | 0.8 | 13 | 5332 2324 | 24 | 14 |
| 26 q | 3− | 2+ | 2+ | 3− | 2+ | 1o | 1o | 1o | 15+ | 0.4 | 0.4 | 8 | 2332 2122 | 17 | 7 |
| 27 q | 2+ | 2o | 2+ | 0+ | 0+ | 1− | 1o | 1− | 10− | 0.1 | 0.2 | 5 | 3331 0111 | 13 | 7 |
| 28 Q | 1+ | 2o | 1− | 2− | 2− | 1+ | 0+ | 0+ | 9+ | 0.2 | 0.2 | 4 | 2311 1111 | 11 | 14 |
| 29 | 1o | 3o | 3+ | 4− | 3− | 3− | 3+ | 3+ | 23o | 1.1 | 0.8 | 15 | 1334 2233 | 21 | 8 |
| 30 | 2+ | 3o | 3− | 2− | 4− | 3− | 4− | 2o | 22− | 1.0 | 0.8 | 13 | 3331 3233 | 21 | 25 |
| 31 D | 5− | 5− | 5+ | 4− | 3+ | 1+ | 3− | 2o | 28− | 1.2 | 1.2 | 25 | 4554 3122 | 26 | 22 |
| | | | | | | | | | Means | 0.80 | 0.73 | 15 | | | 20.8 |
| | | | | | | | | | No. of days | 31 | 31 | 31 | | | 31 |

[1] Five quiet days (Q), ten quiet days (Q or q), five disturbed days (D) selected by Committee on Characterization of Magnetic Disturbances, J. Veldkamp, Kon. Nederlandsch. Meteorologisch Institute, DeBilt, Holland.

[2] Geomagnetic planetary 3-hr range indices $K$, prepared by Committee on Characterization of Magnetic Disturbances, J. Bartels, Chairman, University, Göttingen, Germany.

[3] Preliminary magnetic character figures $C_i$ prepared by J. Veldkamp.

[4] Magnetic character figures $C_p$ prepared by J. Bartels.

[5] Average amplitudes $A_p$ (unit 2 $\gamma$) prepared by J. Bartels.

[6] Fredericksburg 3-hr range indices $K$ ($K9$ = 500 $\gamma$); scale values of variometers in $\gamma$/mm: $D$ = 2.7; $H$ = 2.5, $Z$ = 3.0) prepared by Robert E. Gebhardt, Observer-in-Charge, Fredericksburg Magnetic Observatory, Corbin, Virginia

[7] Provisional sunspot numbers (dependent on observations at Zurich Observatory and its stations at Locarno and Arosa) prepared by M. Waldmeier, Swiss Federal Observatory, Zurich, Switzerland.

# Geomagnetic and Solar Data

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## Sudden Commencements and Solar-Flare Effects, Second Quarter 1962

### Preliminary Report on Sudden Commencements

S.c.'s given by ten or more stations are in italics. Times are mean values obtained from normal magnetograms.

*Sudden commencements followed by a magnetic storm or a period of storminess (s.s.c.)*

1962 April *20d 23h 56m*: fifty-seven (ssc: 51; si: 6).—21d 16h 15m: Es Wn Pr? (b: Tr).—*25d 18h 29m*: forty-four (ssc: 35; si: 9).—25d 19h 21m: Tr So (pt: Cm).

1962 May 05d 18h 37m: Hl Qu MB.—*27d 04h 13m*: forty-one (ssc: 31; si: 8; bs: 2).—31d 05h 52m: Me Qu.

1962 June 07d 05h 24m: Tr Co (si: Te; sfe: Tl).—26d 08h 50m: Ag Lg Ho (si: IK, Me?; b: Pe Bi; sfe: Ks).

*Sudden impulses found in the magnetograms (s.i.)*

1962 April 03d 06h 43m: Hl Te.—06d 04h 48m: Te (ssc: Mc).—16d 02h 04m: Fu Pe.—*20d 15h 35m*: Wn Vl Cm Pr Mb Md Ka Ky (ssc: Es St CF Lg).—25d 17h 45m: Pe? Te.—26d 05h 03m: So Hl.

1962 May 05d 21h 16m: Pe Ks Te? Mc To.—06d 03h 17m: Pe Te (ssc: Ci).—06d 09h 52m: Mb Ka Ky Te MB (ssc: Ho Mc).

1962 June 01d 14h 35m: Hl Be.—01d 21h 36m: Mc Hl.—07d 06h 40m: Hl IK Te MB Mc (ssc: Lg Tl SF; bs: Pe).—09d 00h 59m: Hl Sw Lg (ssc: Ho).—09d 03h 01m: Pe Te (pt: Hu).—09d 07h 24m: Te (ssc: TC).—19d 23h 01m: Me Hl.—26d 07h 15m: Hl Be (bp: Vl).—29d 13h 05m: Pe Bi.

### *Preliminary Report on Solar-Flare Effects (s.f.e.)*

Effects confirmed by ionospheric or solar observations are in italics.

1962 April *01d 17h 25m*: Hu.—03d 10h 00m: Su Eb?.—05d 14h 01m: Le.—*06d 14h 49m*: Hu.—12d 10h 22m: Ks.—12d 10h 34m: Vl Su (si: Hl).—*13d 08h 47m–09h ..*: Eb.—*13d 09h 49m*. Hr.—15d 19h 50m: Te (si: Lg).—15d 22h 03m: Te.—15d 22h 24m: Te.—19d 19h 35m: Fr Ho (si: Hu).—20d 19h 59m: Fr Ho.—21d 20h 11m: Ho Te.—22d 08h 15m: Es Ma?.—24d 12h 15m: Fu.—*27d 14h 13m*: Le Es Wn Wi Vl Cm Ha Ma Db Pr Fu CF Su Aq Md IK Eb Tl Ks MB Hu Hr (si: Be Pe SF Bi; bp: Mb Ka Gu PM; pt: Ky).

1962 May 01d 06h 42m: IK.—*01d 19h 17m*: Fr Hu (bp: Hr).—*03d 18h 11m*: Hu.—*05d 16h 05m*: Hu (si: Tl).—09d 10h 28m: JK.—21d 10h 56m: Ks.—29d 20h 36m–20h 44m: Tl.—31d 13h 12m: Te (si: Pe).

1962 June 05d 23h 54m: Te.—07d 05h 54m: Es.—08d 18h 07m–18h 21m: Tl.—*16d 17h 09m*: Hu.—22d 07h 30m: Le.—*23d 12h 50m*: Hu.—24d 13h 34m: IK Tl Hu.—*25d 15h 51m*: Hu.

## PRINCIPAL MAGNETIC STORMS

(Advance knowledge of the character of the records at some observatories as regards disturbances)

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Amplitudes[3]: D (6) | Amplitudes[3]: H (7) | Amplitudes[3]: Z (8) | C Figure, Degree of Activity[4] (9) | Maximal Activity on K Scale 0 to 9: Gr. Day (10) | Gr. 3-hr Period (11) | K Index (12) | Ranges: D (13) | Ranges: H (14) | Ranges: Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| College, Alaska (K. Cravens) | July 26 | 01 00 | 29 06 | ..... | ..... | ..... | ..... | ms | 26 | 4 | 7 | 213 | 1280 | 870 |
| | July 31 | 15 47 | | ..... | ..... | ..... | ..... | ms | | | | 233 | 2150 | 950 |
| | Aug. | | 2 06 | | | | | | 1 | 4 | 7 | | | |
| | Aug. 7 | 00 .. | 10 20 | ..... | ..... | ..... | ..... | ms | 8 | 3,6 | 6 | 180 | 1050 | 860 |
| | | | | | | | | | 9 | 4 | | | | |
| | Aug. 15 | 04 .. | 15 12 | ..... | ..... | ..... | ..... | ms | 15 | 2,3 | 6 | 107 | 1130 | 420 |
| | Aug. 30 | 23 48 | 31 18 | ..... | ..... | ..... | ..... | ms | 31 | 3 | 7 | 230 | 1440 | 590 |
| | Sept. 1 | 01 .. | 5 02 | ..... | ..... | ..... | ..... | s | 3 | 4 | 8 | 236 | 2290 | 1030 |
| | | | | | | | | | 4 | 4 | | | | |
| | Sept. 5 | 04 .. | 5 23 | ..... | ..... | ..... | ..... | ms | 5 | 3,5,6 | 6 | 196 | 1100 | 530 |
| | Sept. 12 | 01 21 | 14 01 | s.c.* | +11 | −141 | +8 | ms | 12 | 3 | 7 | 192 | 1360 | 990 |
| | Sept. 19 | 00 31 | 20 22 | ..... | ..... | ..... | ..... | ms | 19 | 3 | 7 | 125 | 1210 | 1110 |
| Sitka, Alaska (R. J. Main) | July 26 | 03 .. | 29 14 | ..... | ..... | ..... | ..... | ms | 26 | 4 | 7 | 85 | 790 | 660 |
| | July 31 | 20 .. | | ..... | ..... | ..... | ..... | s | 1 | 4 | 8 | 130 | 1125 | 890 |
| | Aug. | | 1 16 | | | | | | | | | | | |
| | Aug. 6 | 00 .. | 10 15 | ..... | ..... | ..... | ..... | ms | 8 | 3 | 6 | 55 | 220 | 410 |
| | Aug. 15 | 04 .. | 19 19 | ..... | ..... | ..... | ..... | ms | 15 | 3 | 6 | 65 | 230 | 380 |
| | Aug. 31 | 00 .. | 31 15 | ..... | ..... | ..... | ..... | ms | 31 | 3 | 7 | 80 | 485 | 540 |
| | Sept. 2 | 03 .. | 4 19 | ..... | ..... | ..... | ..... | s | 3 | 4 | 8 | 80 | 810 | 755 |
| | Sept. 6 | 04 .. | 6 15 | ..... | ..... | ..... | ..... | ms | 6 | 3 | 6 | 40 | 390 | 400 |
| | Sept. 12 | 06 .. | 14 10 | ..... | ..... | ..... | ..... | ms | 12 | 3 | 7 | 185 | 690 | 620 |
| | Sept. 19 | 05 .. | 20 13 | ..... | ..... | ..... | ..... | ms | 19 | 3 | 7 | 70 | 510 | 460 |
| | Sept. 26 | 00 .. | 26 20 | ..... | ..... | ..... | ..... | | 26 | 2 | 7 | 38 | 510 | 315 |
| Witteveen (D. v. Sabben) | July 26 | 02 .. | 27 19 | ..... | ..... | ..... | ..... | s | 26 | 2 | | | | |
| | | | | | | | | | 27 | 6 | 6 | 25 | 190 | 85 |
| | July 31 | 15 .. | | ..... | ..... | ..... | ..... | m | 31 | 8 | | | | |
| | Aug. | | 1 24 | | | | | | 1 | 1,2,4,8 | 5 | 25 | 175 | 75 |
| | Aug. 7 | 11 .. | 9 13 | ..... | ..... | ..... | ..... | m | 7 | 7,8 | | | | |
| | | | | | | | | | 8 | 1,2 | | | | |
| | | | | | | | | | | 3,6,8 | | | | |
| | | | | | | | | | 9 | 1 | 5 | 25 | 170 | 70 |
| | Aug. 16 | 18 .. | 18 18 | ..... | ..... | ..... | ..... | ms | 17 | 8 | 6 | 20 | 165 | 55 |
| | Sept. 1 | 05 .. | 4 23 | ..... | ..... | ..... | ..... | ms | 1 | 3,6,7,8 | | | | |
| | | | | | | | | | 4 | 6 | 6 | 30 | 200 | 105 |
| | Sept. 12 | 06 .. | 12 24 | ..... | ..... | ..... | ..... | ms | 12 | 3,7,8 | 6 | 35 | 260 | 65 |
| | Sept. 18 | 21 .. | 20 04 | ..... | ..... | ..... | ..... | ms | 19 | 7 | 7 | 45 | 240 | 75 |
| | Sept. 25 | 20 .. | 26 21 | ..... | ..... | ..... | ..... | ms | 26 | 6 | 6 | 30 | 100 | 90 |
| Fredericksburg (R. E. Gebhardt) | July 25 | 22 .. | 9 .. | ..... | ..... | ..... | ..... | ms | 26 | 1 | 6 | 30 | 142 | 64 |
| | July 31 | 15 .. | | ..... | ..... | ..... | ..... | ms | 1 | 4 | 6 | 30 | 105 | 71 |
| | Aug. | | 2 06 | | | | | | | | | | | |
| | Aug. 7 | 14 .. | 10 11 | ..... | ..... | ..... | ..... | m | 8 | 1,2,3 | 5 | 30 | 98 | 64 |
| | | | | | | | | | 9 | 1 | 5 | | | |
| | Aug. 14 | 17 .. | 19 14 | ..... | ..... | ..... | ..... | m | 15 | 3 | 5 | 27 | 113 | 68 |
| | | | | | | | | | 16 | 1,3 | | | | |
| | | | | | | | | | 18 | 2 | | | | |
| | | | | | | | | | 19 | 1,2 | | | | |
| | Aug. 21 | 17 .. | 26 10 | ..... | ..... | ..... | ..... | m | 22 | 1,2,3 | 5 | 26 | 103 | 64 |
| | | | | | | | | | 24 | 3 | | | | |
| | | | | | | | | | 25 | 1 | | | | |
| | Aug. 30 | 23 38 | 31 14 | s.c. | ..... | 10 | ..... | m | 31 | 2,3 | 5 | 23 | 77 | 39 |
| | Sept. 1 | 06 .. | 4 24 | ..... | ..... | ..... | ..... | ms | 3 | 2 | 6 | 28 | 110 | 84 |
| | | | | | | | | | 4 | 2 | | | | |
| | Sept. 11 | 20 .. | 14 09 | ..... | ..... | ..... | ..... | ms | 12 | 3 | 7 | 43 | 140 | 163 |
| | Sept. 18 | 21 .. | 20 04 | ..... | ..... | ..... | ..... | m | 19 | 8 | 5 | 27 | 94 | 56 |
| | | | | | | | | | 20 | 1 | 5 | | | |
| | Sept. 25 | 18 .. | 26 09 | ..... | ..... | ..... | ..... | m | 26 | 1,2 | 5 | 14 | 123 | 27 |
| Tucson (C. J. Beers) | July 4 | 18 .. | 6 15 | ..... | ..... | ..... | ..... | m | 5 | 2 | 5 | 15 | 79 | 24 |
| | July 19 | 16 .. | 21 06 | ..... | ..... | ..... | ..... | m | 20 | 3 | 5 | 12 | 63 | 28 |
| | July 25 | 20 .. | 28 08 | ..... | ..... | ..... | ..... | ms | 26 | 2 | 6 | 15 | 127 | 34 |
| | July 31 | 19 .. | | ..... | ..... | ..... | ..... | ms | 1 | 2,4 | 6 | 23 | 88 | 35 |
| | Aug. | | 1 15 | | | | | | | | | | | |
| | Aug. 7 | 15 .. | 10 15 | ..... | ..... | ..... | ..... | m | 8 | 1,2,3 | 5 | | | |
| | | | | | | | | | 9 | 3 | 5 | 12 | 109 | 45 |

PRINCIPAL MAGNETIC STORMS (Continued)

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Amplitudes[3]: D (6) | Amplitudes[3]: H (7) | Amplitudes[3]: Z (8) | C Figure, Degree of Activity[4] (9) | Maximal Activity on K Scale 0 to 9: Gr. Day (10) | Gr. 3-hr Period (11) | K Index (12) | Ranges: D (13) | Ranges: H (14) | Ranges: Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| | Aug. 14 | 19 .. | 19 15 | ..... | ..... | ..... | ..... | m | 15 | 3 | 5 | | | |
| | | | | | | | | | 16 | 3 | 5 | | | |
| | | | | | | | | | 18 | 2,3 | 5 | 15 | 113 | 46 |
| | Aug. 21 | 22 .. | 25 04 | ..... | ..... | ..... | ..... | m | 22 | 1,2,3 | 5 | | | |
| | | | | | | | | | 24 | 3 | 5 | 13 | 104 | 35 |
| | Aug. 30 | 23 35 | | s.c. | +1 | +9 | +1 | ms | 2 | 2 | 6 | | | |
| | Sept. | | 4 18 | | | | | | 3 | 4 | 6 | 19 | 111 | 44 |
| | Sept. 12 | 05 .. | 14 09 | ..... | ..... | ..... | ..... | ms | 12 | 3 | 6 | 19 | 140 | 35 |
| | Sept. 19 | 00 .. | 20 15 | ..... | ..... | ..... | ..... | m | 19 | 3,7,8 | 5 | 12 | 99 | 41 |
| | Sept. 25 | 18 .. | 26 18 | ..... | ..... | ..... | ..... | ms | 26 | 1 | 6 | 11 | 137 | 27 |
| San Juan (M. Vazquez) | July | | No Storms | | | | | | | | | | | |
| | Aug. | | No Storms | | | | | | | | | | | |
| | Sept. 11 | 19 29 | 13 04 | ..... | ..... | ..... | ..... | m | 12 | 3 | 6 | 10 | 125 | 50 |
| Honolulu (C. D. Upham) | July 25 | 20 .. | 27 18 | ..... | ..... | ..... | ..... | ms | 26 | 2 | 7 | 7 | 175 | 30 |
| | July 31 | 15 .. | | ..... | ..... | ..... | ..... | m | 1 | 1,4 | 5 | 8 | 115 | 39 |
| | Aug. | | 1 18 | | | | | | | | | | | |
| | Aug. 7 | 16 .. | 8 20 | ..... | ..... | ..... | ..... | m | 8 | 1,3 | 5 | 6 | 67 | 19 |
| | Aug. 15 | 04 .. | 15 12 | ..... | ..... | ..... | ..... | m | 15 | 2,3 | 5 | 3 | 63 | 15 |
| | Aug. 29 | 04 .. | 29 16 | ..... | ..... | ..... | ..... | m | 29 | 2,3,4 | 4 | 3 | 50 | 20 |
| | Aug. 30 | 23 36 | 31 13 | s.c. | ..... | +7 | +2 | m | 31 | 1,3 | 5 | 5 | 93 | 16 |
| | Sept. 11 | 19 .. | 13 12 | ..... | ..... | ..... | ..... | ms | 12 | 3 | 6 | 11 | 118 | 59 |
| | Sept. 18 | 20 .. | | | | | | | | | | | | |
| | Sept. 19 | 00 31 | 20 06 | s.c. | ..... | +5 | +2 | m | 19 | 2,3 | 5 | 6 | 113 | 43 |
| | Sept. 25 | 18 .. | 26 24 | ..... | ..... | ..... | ..... | ms | 26 | 1 | 6 | 5 | 127 | 31 |
| Huancayo (A. Giesecke M. Casaverde R.) | July 26 | 02 30 | 26 20 | ..... | ..... | ..... | ..... | m | 26 | 2,5 | 5 | 8 | 125 | 21 |
| | Aug. | No Storms | | | | | | | | | | | | |
| | Sept. 12 | 05 20 | 12 24 | ..... | ..... | ..... | ..... | m | 12 | 6,7 | 5 | 5 | 222 | 38 |
| | Sept. 19 | 00 31 | 19 24 | s.c. | 0 | +9 | +1 | m | 19 | 6 | 5 | 5 | 262 | 33 |
| | Sept. 26 | 00 10 | 26 22 | ..... | ..... | ..... | ..... | m | 26 | 1,2,5 | 5 | 2 | 240 | 18 |
| Port Moresby (J. A. Brooks) | July | No Storms | | | | | | | | | | | | |
| | Aug. | No Storms | | | | | | | | | | | | |
| | Sept. | No Storms | | | | | | | | | | | | |
| Apia (J. G. Keys) | July 25 | 20 . | 29 09 | ..... | ..... | ..... | ..... | ms | 26 | 2 | 6 | 7 | 194 | 41 |
| | July 31 | 14 .. | .. .. | ..... | ..... | ..... | ..... | m | 1 | 4 | 5 | 4 | 106 | 24 |
| | Aug. | .. | 2 03 | ..... | ..... | ..... | ..... | | | | | | | |
| | Aug. 5 | 22 .. | 9 15 | ..... | ..... | ..... | ..... | m | 8 | 1 | 5 | 4 | 113 | 37 |
| | Aug. 13 | 17 .. | 20 03 | ..... | ..... | ..... | ..... | m | 15 | 3 | 5 | 4 | 103 | 38 |
| | Sept. 1 | 03 08 | 6 15 | ..... | ..... | ..... | ..... | m | 3 | 4 | 5 | 4 | 86 | 25 |
| | Sept. 11 | 19 28 | 14 04 | ..... | ..... | ..... | ..... | ms | 12 | 3 | 6 | 6 | 146 | 39 |
| | Sept. 18 | 20 .. | 20 13 | ..... | ..... | ..... | ..... | m | 19 | 3 | 5 | 4 | 155 | 28 |
| | Sept. 25 | 20 .. | 27 03 | ..... | ..... | ..... | ..... | m | 25 | 8 | 5 | 6 | 153 | 35 |
| Hermanus (A. M. van Wijk) | July 4 | 20 .. | 4 24 | Bay | ..... | ..... | ..... | m | 4 | 8 | 5 | 11 | 47 | 35 |
| | July 26 | 00 .. | 28 12 | ..... | ..... | ..... | ..... | m | 26 | 2,3,4 | 5 | 24 | 113 | 78 |
| | | | | | | | | | 27 | 6 | 5 | | | |
| | July 31 | 15 .. | | ..... | ..... | ..... | ..... | m | 31 | 8 | 5 | 12 | 85 | 62 |
| | Aug. | | 2 02 | | | | | | 1 | 1 | 5 | | | |
| | Aug. 14 | 21 .. | 15 11 | Bays | ..... | ..... | ..... | m | 15 | 2 | 5 | 17 | 38 | 44 |
| | Aug. 16 | 18 .. | 18 10 | ..... | ..... | ..... | ..... | m | 17 | 8 | 5 | 21 | 59 | 56 |
| | | | | | | | | | 18 | 3 | 5 | | | |
| | Aug. 21 | 22 .. | 23 10 | Bays | ..... | ..... | ..... | m | 22 | 1,7 | 5 | 16 | 33 | 51 |
| | Sept. 3 | 18 .. | 4 01 | Bays | ..... | ..... | ..... | m | 3 | 7,8 | 5 | 15 | 65 | 76 |
| | Sept. 12 | 5 .. | 13 03 | ..... | ..... | ..... | ..... | ms | 12 | 3 | 6 | 33 | 126 | 107 |
| | Sept. 13 | 16 .. | 13 21 | Bay | ..... | ..... | ..... | m | 13 | 7 | 5 | 7 | 49 | 62 |
| | Sept. 18 | 20 .. | 20 03 | ..... | ..... | ..... | ..... | ms | 19 | 7 | 6 | 23 | 84 | 86 |
| Gnangara (P. M. McGregor) | July 26 | 03 .. | 28 09 | ..... | ..... | ..... | ..... | ms | 26 | 2 | 6 | 14 | (163) | (122) |
| | | No record: | | 26th 2329 to 27th 0310 | | | | | | | | | | |
| | | | | 27th 2350 to 28th 0325 | | | | | | | | | | |
| | | | | | | | | | | | | 19 | 103 | 133 |
| | July 31 | 16 .. | .. .. | ..... | ..... | ..... | ..... | | | | | 13 | 87 | 77 |
| | Aug. | | 1 24 | ..... | ..... | ..... | ..... | ms | 1 | 4 | 6 | 13 | 87 | 77 |
| | Aug. 16 | 19 .. | 19 17 | ..... | ..... | ..... | ..... | m | 16 | 7 | 5 | | | |
| | | | | | | | | | 17 | 7,8 | | | | |

PRINCIPAL MAGNETIC STORMS (Continued)

| Observatory (Observer-in-Charge) (1) | Greenwich Date (2) | Storm Time: GMT of Begin. (3) | Storm Time: GMT of Ending[1] (4) | Sudden Commencement: Type[2] (5) | Amplitudes[3]: D (6) | Amplitudes[3]: H (7) | Amplitudes[3]: Z (8) | C Figure, Degree of Activity[4] (9) | Maximal Activity on K Scale 0 to 9: Gr. Day (10) | Gr. 3-hr Period (11) | K Index (12) | Ranges: D (13) | Ranges: H (14) | Ranges: Z (15) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| | Sept. 1 | 03 .. | 5 00 | ..... | ..... | ..... | ..... | ms | 3 | 4 | 6 | 17 | 918 | 101 |
| | | No record: 10th 0350 to 14th 0606; 14th 1735 to 14th 2338 | | | | | | | | | | | | |
| | Sept. 18 | 20 11 | 20 15 | ..... | ..... | ..... | ..... | ms | 19 | 7 | 6 | 13 | 114 | 88 |
| | Sept. 21 | 13 .. | 23 09 | ..... | ..... | ..... | ..... | m | 21 | 6 | 5 | 14 | 63 | 77 |
| | | | | | | | | | 22 | 4 | | | | |
| Amberley (A. L. Cullington) | July 26 | 03 .. | 28 08 | gradual | ..... | ..... | ..... | ms | 26 | 2.4 | 6 | 31 | 150 | 61 |
| | Aug. | No storms | | | | | | | | | | | | |
| | Sept. 12 | 00 00 | 13 21 | gradual | ..... | ..... | ..... | ms | 12 | 3 | 6 | 34 | 156 | 53 |
| | Sept. 18 | 23 00 | 20 13 | gradual | ..... | ..... | ..... | m | 19 | 3 | 5 | 16 | 130 | 58 |

[1] Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces; more specifically, when the *K*-index measure diminished to 2 or less for a reasonable period.

[2] s.c. = sudden commencement; s.c.* = small initial impulse followed by main impulse (the amplitude in this case is that of the main impulse only, neglecting the initial brief pulse); .... = gradual commencement.

[3] Signs of amplitudes of *D* and *Z* taken algebraically; *D* reckoned positive if toward the east and *Z* reckoned positive if vertically downward.

[4] Storm described by three degrees of activity: *m* for moderate (when *K* index as great as 5); *ms* for moderately severe (when *K* = 6 or 7); *s* for severe (when *K* = 8 or 9).

## SELECTED GEOMAGNETIC AND SOLAR DATA

### $K_p$, $C_i$, $C_p$, $A_p$, $K_{Fr}$, $R_z$ and Selected Days, September 1962

| Day[1] | 3-hr Range Indices $K_p$[2] 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Prel.[3] $C_i$ | $C_p$[4] | $A_p$[5] | 3-hr Range Indices $K_{Fr}$[6] Values | Sum | Prov.[7] $R_z$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3+ | 2+ | 5− | 4o | 4o | 5o | 5− | 4o | 32o | 1.3 | 1.3 | 29 | 3343 3343 | 26 | 48 |
| 2 D | 3o | 5− | 5− | 5− | 6− | 4o | 4+ | 3+ | 34+ | 1.3 | 1.4 | 34 | 4554 5443 | 34 | 57 |
| 3 D | 4o | 5+ | 4− | 5+ | 4o | 4o | 6− | 6+ | 38+ | 1.5 | 1.5 | 47 | 5645 4345 | 36 | 81 |
| 4 D | 5− | 6− | 4+ | 5− | 4o | 5o | 4− | 3o | 35o | 1.3 | 1.4 | 36 | 4644 3433 | 31 | 88 |
| 5 | 1o | 3+ | 4o | 3+ | 3o | 4− | 3− | 3o | 24o | 1.0 | 0.9 | 16 | 1334 3323 | 22 | 90 |
| 6 | 4− | 4o | 5o | 4o | 3− | 2o | 3o | 3+ | 28− | 1.0 | 1.1 | 22 | 3444 3222 | 24 | 82 |
| 7 | 4− | 4− | 4o | 3o | 3− | 1+ | 2o | 1+ | 22− | 0.8 | 0.8 | 14 | 4443 3231 | 24 | 71 |
| 8 | 3+ | 4o | 4o | 3o | 2− | 2o | 1o | 2− | 21− | 0.8 | 0.8 | 14 | 3443 2112 | 20 | 59 |
| 9 | 3− | 3o | 1− | 2o | 2+ | 2o | 3o | 3+ | 19o | 0.7 | 0.6 | 11 | 2312 3133 | 18 | 58 |
| 10 q | 3o | 4o | 3− | 3o | 2− | 1− | 1− | 1o | 17− | 0.5 | 0.6 | 11 | 3433 2112 | 19 | 44 |
| 11 q | 2+ | 1+ | 2+ | 4− | 1− | 1− | 2− | 3− | 15+ | 0.5 | 0.5 | 9 | 2134 1023 | 16 | 51 |
| 12 D | 3− | 3o | 7+ | 5o | 4− | 5− | 7− | 6− | 39− | 1.6 | 1.7 | 58 | 2374 3444 | 31 | 62 |
| 13 | 4o | 3+ | 4− | 3− | 3o | 4+ | 5o | 2o | 28o | 1.2 | 1.1 | 23 | 4332 3342 | 24 | 59 |
| 14 q | 3o | 3o | 4o | 2− | 1o | 2− | 2o | 2+ | 19− | 0.6 | 0.6 | 11 | 3442 2222 | 21 | 53 |
| 15 | 3o | 4− | 4o | 3− | 1− | 2+ | 3+ | 3o | 23− | 0.9 | 0.9 | 15 | 3442 1232 | 21 | 60 |
| 16 q | 2+ | 3− | 1− | 2o | 2o | 2− | 3o | 3+ | 18− | 0.7 | 0.5 | 10 | 2211 1223 | 14 | 42 |
| 17 Q | 2o | 3− | 2+ | 1+ | 2o | 1+ | 2− | 2o | 15+ | 0.3 | 0.4 | 7 | 2331 2122 | 16 | 33 |
| 18 Q | 2− | 1− | 1o | 1o | 1o | 1o | 1+ | 3− | 10+ | 0.2 | 0.2 | 5 | 1111 1123 | 11 | 35 |
| 19 D | 3o | 4+ | 6− | 4o | 3+ | 4+ | 6o | 5− | 35+ | 1.5 | 1.4 | 39 | 3343 3445 | 29 | 24 |
| 20 | 5− | 3+ | 2+ | 4− | 2+ | 1− | 1o | 1− | 19− | 0.7 | 0.8 | 13 | 5223 2121 | 18 | 24 |
| 21 | 2o | 3− | 3− | 2− | 3o | 4− | 3− | 3− | 24o | 0.7 | 0.7 | 12 | 2331 2332 | 19 | 32 |
| 22 | 4o | 4− | 3o | 4o | 4− | 4− | 4− | 2+ | 28o | 1.0 | 1.1 | 21 | 3333 3332 | 23 | 32 |
| 23 | 3+ | 4+ | 3o | 3+ | 1+ | 1o | 1+ | 2+ | 20o | 0.7 | 0.8 | 13 | 3532 1122 | 19 | 41 |
| 24 Q | 2+ | 3o | 1o | 0+ | 1− | 0+ | 2o | 2− | 11+ | 0.1 | 0.3 | 6 | 2320 1022 | 12 | 54 |
| 25 Q | 0+ | 1− | 1− | 2− | 2− | 2+ | 2+ | 3o | 13− | 0.4 | 0.3 | 7 | 1111 1233 | 13 | 53 |
| 26 | 5+ | 6− | 3+ | 2o | 3+ | 5+ | 4o | 2+ | 31+ | 1.4 | 1.3 | 32 | 5532 3433 | 28 | 55 |
| 27 q | 3o | 2+ | 2o | 2+ | 3− | 2o | 1o | 2− | 17o | 0.4 | 0.5 | 9 | 4222 2112 | 16 | 51 |
| 28 Q | 3− | 1+ | 1− | 1o | 2+ | 3− | 2− | 3+ | 16− | 0.6 | 0.5 | 9 | 3111 2223 | 15 | 47 |
| 29 | 2o | 3+ | 3o | 3+ | 2+ | 2+ | 3+ | 5+ | 25o | 1.1 | 1.0 | 19 | 2334 2224 | 22 | 36 |
| 30 | 4o | 4+ | 3o | 3− | 3− | 2o | 2− | 1+ | 22− | 0.8 | 0.8 | 14 | 4333 3222 | 22 | 46 |
| | | | | | | | | | Means | 0.85 | 0.86 | 19 | | | 52.3 |
| | | | | | | | | | No. of days | 30 | 30 | 30 | | | 30 |

[1] Five quiet days (Q), ten quiet days (Q or q), five disturbed days (D) selected by Committee on Characterization of Magnetic Disturbances, J. Veldkamp, Kon. Nederlandsch Meteorologisch Institut, DeBilt, Holland.

[2] Geomagnetic planetary 3-hr-range indices $K_p$ prepared by Committee on Characterization of Magnetic Disturbances, J. Bartels, Chairman, University, Göttingen, Germany.

[3] Preliminary magnetic character figures, $C_i$, prepared by J. Veldkamp.

[4] Magnetic character figures, $C_p$, prepared by J. Bartels.

[5] Average amplitudes $A_p$ (unit 2 $\gamma$), prepared by J. Bartels.

[6] Fredericksburg 3-hr-range indices $K$ ($K9 = 500\ \gamma$); scale values of variometers in $\gamma$ mm: $D = 2.8$; $H = 2.5$, $Z = 3.0$) prepared by Robert E. Gebhardt, Observer-in-Charge, Fredericksburg Magnetic Observatory, Corbin, Virginia.

[7] Provisional sunspot numbers (dependent on observations at Zurich Observatory and its stations at Locarno and Arosa) prepared by M. Waldmeier, Swiss Federal Observatory, Zurich, Switzerland.

# Geomagnetic and Solar Data

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## PRINCIPAL MAGNETIC STORMS

(Advance knowledge of the character of the records at some observatories as regards disturbances)

| Observatory (Observer-in-Charge) | Green-wich Date | Storm Time | | Sudden Commencement | | | | C Figure, Degree of Activity[4] | Maximal Activity on K Scale 0 to 9 | | | Ranges | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GMT of Begin. | GMT of Ending[1] | Type[2] | Amplitudes[3] | | | | Gr. Day | Gr. 3-hr Period | K Index | D | H | Z |
| | | | | | D | H | Z | | | | | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
| | *1962* | *h m* | *d h* | | ′ | γ | γ | | | | | ′ | γ | γ |
| Toolangi (C. A. van der Waal) | July 26 | 02 00 | 29 08 | ..... | ..... | ..... | ..... | ms | 26 | 2.4 | 6 | 32 | 168 | 82 |
| | July 31 | 17 30 | | | | | | | | | | | | |
| | Aug. | | 1 18 | ..... | ..... | ..... | ..... | ms | 1 | 4 | 6 | 23 | 126 | 50 |
| | Aug. | | | No storms | | | | | | | | | | |
| | Sept. 12 | 01 22 | 14 09 | s.c.* | ..... | −13 | ..... | ms | 12 | 3 | 6 | 22 | 166 | 77 |

[1] Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces; more specifically, when the K-index measure diminished to 2 or less for a reasonable period.

[2] s.c. = sudden commencement; s.c.* = small initial impulse followed by main impulse (the amplitude in this case is that of the main impulse only, neglecting the initial brief pulse); = gradual commencement.

[3] Signs of amplitudes of D and Z taken algebraically; D reckoned positive if toward the east and Z reckoned positive if vertically downward.

[4] Storm described by three degrees of activity: m for moderate (when K index as great as 5); ms for moderately severe (when K = 6 or 7); s for severe (when K = 8 or 9).

$K_p$, $C_i$, $C_p$, $A_p$, $K_{Fr}$, $R_o$ and Selected Days, October 1962

| Day[1] | 3-hr Range Indices $K_p$[2] 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Prel.[3] $C_i$ | $C_p$[4] | $A_p$[5] | 3-hr Range Indices [6]$K_{Fr}$ Values | Sum | Prov.[7] $R_o$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 D | 3+ | 4+ | 5o | 5o | 5+ | 5− | 6− | 5− | 38o | 1.5 | 1.5 | 43 | 3455 5344 | 33 | 51 |
| 2 | 4+ | 4− | 5− | 4− | 4− | 4+ | 3− | 1+ | 28+ | 1.1 | 1.1 | 23 | 4353 3321 | 24 | 35 |
| 3 q | 2− | 3− | 4− | 2+ | 3+ | 2− | 2− | 3− | 20− | 0.7 | 0.7 | 11 | 2242 3212 | 18 | 22 |
| 4 Q | 2+ | 3+ | 3o | 2o | 1− | 2+ | 2o | 3− | 18+ | 0.6 | 0.6 | 10 | 2332 1212 | 16 | 18 |
| 5 q | 1o | 2− | 1+ | 1o | 1+ | 3− | 5− | 3+ | 17o | 0.8 | 0.7 | 12 | 0221 1243 | 15 | 13 |
| 6 | 5− | 4− | 4+ | 1o | 3+ | 3− | 0+ | 2+ | 22+ | 0.8 | 0.9 | 17 | 4331 3212 | 19 | 25 |
| 7 q | 2+ | 3+ | 1+ | 2o | 1− | 1+ | 3+ | 4+ | 19− | 0.8 | 0.7 | 12 | 2312 1134 | 17 | 37 |
| 8 D | 6+ | 4− | 3+ | 4+ | 3+ | 5− | 4o | 4o | 34− | 1.5 | 1.4 | 35 | 5334 3444 | 30 | 40 |
| 9 D | 6− | 4+ | 5− | 4− | 4+ | 4o | 3o | 4− | 33+ | 1.3 | 1.3 | 32 | 5443 3334 | 29 | 42 |
| 10 | 4− | 3+ | 3− | 3+ | 5− | 4− | 4+ | 3− | 28+ | 1.2 | 1.1 | 22 | 4432 4333 | 26 | 51 |
| 11 | 4− | 5o | 4+ | 3+ | 4− | 3o | 4− | 3+ | 30o | 1.1 | 1.2 | 25 | 3543 3233 | 26 | 63 |
| 12 Q | 3o | 2+ | 2+ | 4− | 2− | 1+ | 1− | 1− | 16− | 0.4 | 0.5 | 9 | 3234 1211 | 17 | 63 |
| 13 q | 1− | 1+ | 1+ | 3+ | 4− | 3− | 2+ | 3o | 18+ | 0.7 | 0.6 | 11 | 1113 3233 | 17 | 74 |
| 14 | 4o | 4+ | 5− | 5− | 4o | 3o | 5− | 4− | 33o | 1.3 | 1.3 | 30 | 3444 3333 | 27 | 67 |
| 15 Q | 3− | 3+ | 2+ | 3− | 2− | 3− | 1− | 2o | 18o | 0.5 | 0.6 | 10 | 3332 2212 | 18 | 62 |
| 16 | 3− | 2o | 2o | 6− | 4o | 2o | 4− | 3o | 25o | 1.1 | 1.0 | 20 | 2114 4232 | 19 | 51 |
| 17 Q | 3+ | 2+ | 3− | 2o | 1− | 0o | 1o | 1+ | 13+ | 0.3 | 0.4 | 7 | 4222 1021 | 14 | 43 |
| 18 | 5− | 5− | 2− | 1+ | 2− | 3+ | 3o | 1+ | 22− | 0.8 | 0.9 | 17 | 4412 2321 | 19 | 33 |
| 19 | 0+ | 0o | 5o | 5o | 5− | 5o | 4− | 4− | 27+ | 1.4 | 1.3 | 29 | 0045 3333 | 21 | 29 |
| 20 q | 2o | 2o | 2− | 1o | 3− | 3− | 3o | 4− | 19− | 0.6 | 0.6 | 11 | 2211 2234 | 17 | 28 |
| 21 | 4− | 3+ | 2+ | 2+ | 2o | 4− | 3o | 2o | 22+ | 0.7 | 0.8 | 14 | 3322 2322 | 19 | 35 |
| 22 | 2+ | 4− | 3o | 4o | 4+ | 3+ | 3+ | 5− | 29− | 1.1 | 1.1 | 22 | 2334 3334 | 25 | 41 |
| 23 | 5o | 4o | 3o | 4− | 3+ | 4− | 3o | 3+ | 29o | 1.0 | 1.1 | 23 | 5432 2233 | 24 | 43 |
| 24 | 3o | 4− | 3− | 3o | 4o | 5o | 5− | 5− | 31− | 1.3 | 1.2 | 27 | 3422 3544 | 25 | 41 |
| 25 D | 4− | 4+ | 4+ | 4o | 4+ | 5− | 5− | 5o | 35o | 1.4 | 1.3 | 34 | 4454 4444 | 33 | 43 |
| 26 D | 4− | 4− | 5− | 4+ | 4+ | 4+ | 5+ | 4o | 34+ | 1.3 | 1.3 | 33 | 4444 4344 | 31 | 48 |
| 27 | 4− | 4o | 5o | 3o | 5o | 5− | 3− | 3+ | 31+ | 1.3 | 1.3 | 29 | 3442 4434 | 28 | 42 |
| 28 | 3+ | 4+ | 3+ | 3o | 3o | 3− | 3+ | 3o | 26o | 0.9 | 1.0 | 18 | 3433 3223 | 23 | 31 |
| 29 | 3o | 3− | 3− | 3− | 2+ | 3− | 2+ | 3+ | 22− | 0.7 | 0.7 | 12 | 3223 2123 | 18 | 15 |
| 30 | 3o | 3o | 3o | 3+ | 2+ | 3o | 3+ | 2+ | 23+ | 0.7 | 0.8 | 14 | 2333 2222 | 19 | 20 |
| 31 Q | 2o | 2+ | 2+ | 3− | 2o | 2− | 2+ | 3− | 18o | 0.7 | 0.5 | 9 | 2322 1122 | 15 | 23 |
| | | | | | | | | | Means | 0.95 | 0.95 | 20 | | | 39.6 |
| | | | | | | | | | No. of days | 31 | 31 | 31 | | | 31 |

[1] Five quiet days (Q), ten quiet days (Q or q), five disturbed days (D) selected by Committee on Characterization of Magnetic Disturbances, J. Veldkamp, Kon. Nederlandsch Meteorologisch Institut, DeBilt, Holland.

[2] Geomagnetic planetary 3-hr range indices $K_p$ prepared by Committee on Characterization of Magnetic Disturbances, J. Bartels Chairman, University, Göttingen, Germany.

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