

Georgi Dobrovolski Solar Observatory

NEW ZEALAND

E-MAIL: gdso@earthling.net

WEBSITE: www.cv-helios.net/gdso

SUNSPOT RESULTS FOR JULY 2003

All observations carried out by HOWARD BARNES.

Telescope : 76 mm refractor (f.l. 910 mm) k considered as 1 .

Observed by PROJECTION . Full disc diameter = 145 mm approx .

WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value ;

QC = Quality Count ; QC² = Squared Quality Count .

Q = Quietness [ie. steadiness] refer to Kiepenheuer scale .

S = Sharpness [ie. clarity] refer to Kiepenheuer scale .

T = Transparency where 1 = excellent , 5 = worthless .

| DATE | UT* | g | f | WN | p | s | SN | BX | CV | QC | QC ² | Q | S | T | Ref. |
|------|------|------|-------|--------|-------|-------|--------|---------|--------|-------|-----------------|------|------|------|------|
| 01 | 2220 | 7 | 33 | 103 | 12 | 10 | 130 | 1003 | 121 | 20 | 74 | 3.0 | 3.5 | 2.5 | 4284 |
| 02 | | | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | |
| 05 | 2230 | 2 | 53 | 73 | 11 | 14 | 124 | 1620 | 91 | 10 | 52 | 2.0 | 2.5 | 2.5 | 4285 |
| 06 | 2225 | 5 | 59 | 109 | 11 | 21 | 131 | 1623 | 106 | 16 | 64 | 2.0 | 2.5 | 2.0 | 4286 |
| 07 | 2230 | 6 | 52 | 112 | 15 | 19 | 169 | 1409 | 149 | 21 | 89 | 1.5 | 2.0 | 2.0 | 4287 |
| 08 | | | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | |
| 18 | 2210 | 7 | 91 | 161 | 18 | 27 | 207 | 2807 | 113 | 22 | 86 | 1.0 | 2.0 | 2.5 | 4288 |
| 19 | 2225 | 10 | 100 | 200 | 19 | 28 | 218 | 2704 | 203 | 33 | 131 | 2.0 | 2.5 | 2.0 | 4289 |
| 20 | | | | | | | | | | | | | | | |
| 21 | 2200 | 9 | 79 | 169 | 18 | 24 | 204 | 1964 | 214 | 31 | 125 | 1.5 | 2.5 | 2.5 | 4290 |
| 22 | 2245 | 8 | 50 | 130 | 14 | 16 | 156 | 1231 | 227 | 27 | 111 | 1.5 | 2.0 | 2.0 | 4291 |
| 23 | 2225 | 8 | 34 | 114 | 12 | 10 | 130 | 813 | 175 | 25 | 101 | 2.0 | 2.0 | 2.0 | 4292 |
| 24 | 2225 | 7 | 21 | 91 | 9 | 6 | 96 | 522 | 155 | 19 | 63 | 1.5 | 2.0 | 2.0 | 4293 |
| 25 | 2255 | 4 | 6 | 46 | 3 | 3 | 33 | 98 | 33 | 9 | 21 | 1.5 | 2.0 | 2.0 | 4294 |
| 26 | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | |
| 28 | 2240 | 4 | 20 | 60 | 8 | 3 | 83 | 422 | 84 | 14 | 54 | 1.5 | 2.0 | 2.5 | 4295 |
| 29 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | |
| ? | — | 77 | 598 | 1368 | 150 | 181 | 1681 | 16216 | 1671 | 247 | 971 | 21.0 | 27.5 | 26.5 | — |
| NOBS | — | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | — |
| MNS | — | 6.42 | 49.83 | 114.00 | 12.50 | 15.08 | 140.08 | 1351.33 | 139.25 | 20.58 | 80.92 | 1.75 | 2.29 | 2.21 | — |

MEAN WEIGHT = 0.4895

MEAN CONDITION = 2.0833

TRUNCATED WOLF NUMBER = 102.58

* Stated times approximate Co-ordinated Universal Time / Temps Universel Coordonné (UTC).

Georgi Dobrovolski Solar Observatory

SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR JULY 2003

All observations carried out by HOWARD BARNES .

Telescope : 76 mm refractor (f . l . 910 mm) .

Observed by PROJECTION . Full disc diameter = 145 mm approx .

IS = Inter-Sol Index .

gr = number of multi-spot groups .

grfp = number of umbrae within penumbrae within the groups (gr) .

grf = number of non-penumbral spots within the groups (gr) .

efp = number of single penumbral spots .

ef = number of single non-penumbral spots .

Q = Quietness [ie. steadiness] refer to Kiepenheuer scale .

S = Sharpness [ie. clarity] refer to Kiepenheuer scale .

T = Transparency where 1 = excellent , 5 = worthless .

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|------|------|-------|------|-------|-------|------|------|------|------|------|------|
| 01 | 2220 | 36 | 3 | 20 | 9 | 3 | 1 | 3.0 | 3.5 | 2.5 | 4284 |
| 02 | | | | | | | | | | | |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | 2230 | 55 | 2 | 39 | 14 | 0 | 0 | 2.0 | 2.5 | 2.5 | 4285 |
| 06 | 2225 | 63 | 4 | 37 | 21 | 1 | 0 | 2.0 | 2.5 | 2.0 | 4286 |
| 07 | 2230 | 56 | 4 | 32 | 18 | 1 | 1 | 1.5 | 2.0 | 2.0 | 4287 |
| 08 | | | | | | | | | | | |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | 2210 | 95 | 4 | 61 | 27 | 3 | 0 | 1.0 | 2.0 | 2.5 | 4288 |
| 19 | 2225 | 107 | 7 | 70 | 27 | 2 | 1 | 2.0 | 2.5 | 2.0 | 4289 |
| 20 | | | | | | | | | | | |
| 21 | 2200 | 85 | 6 | 53 | 23 | 2 | 1 | 1.5 | 2.5 | 2.5 | 4290 |
| 22 | 2245 | 54 | 4 | 31 | 15 | 3 | 1 | 1.5 | 2.0 | 2.0 | 4291 |
| 23 | 2225 | 38 | 4 | 22 | 8 | 2 | 2 | 2.0 | 2.0 | 2.0 | 4292 |
| 24 | 2225 | 24 | 3 | 12 | 5 | 3 | 1 | 1.5 | 2.0 | 2.0 | 4293 |
| 25 | 2255 | 8 | 2 | 1 | 3 | 2 | 0 | 1.5 | 2.0 | 2.0 | 4294 |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | 2240 | 23 | 3 | 16 | 3 | 1 | 0 | 1.5 | 2.0 | 2.5 | 4295 |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| ? | — | 644 | 46 | 394 | 173 | 23 | 8 | 21.0 | 27.5 | 26.5 | — |
| NOBS | — | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | — |
| MNS | — | 53.67 | 3.83 | 32.83 | 14.42 | 1.92 | 0.67 | 1.75 | 2.29 | 2.21 | — |

Georgi Dobrovolski Solar Observatory

SUNSPOT CENSUS BY CLASSIFICATION FOR JULY 2003

All observations carried out by HOWARD BARNES .

Telescope : 76 mm refractor (f . l . 910 mm) .

Observed by PROJECTION . Full disc diameter = 145 mm approx .

IF 2 OR MORE REGIONS ARE OF THE SAME CLASSIFICATION , THEN SUNSPOT COUNTS ARE SEPARATED BY SOLIDI (/) .

| DATE | UT | A | | B | | C | | D | | E | | F | | G | | H | | J | |
|---------------------------------------|------|------|------|--------------------------------|------|-----|-----|------|--------|--------------------------------|-----|---|-----|---|---|---|---|----|---------|
| | | g | f | g | f | g | f | g | f | g | f | g | f | g | f | g | f | g | f |
| 01 | 2220 | 1 | 1 | 0 | 0 | 1 | 3 | 1 | 4 | 0 | 0 | 1 | 22 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 02 | | | | | | | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | 2230 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 16 | 0 | 0 | 1 | 37 | 0 | 0 | 0 | 0 | 0 | 0 |
| 06 | 2225 | 0 | 0 | 2 | 2/3 | 0 | 0 | 1 | 19 | 0 | 0 | 1 | 34 | 0 | 0 | 0 | 0 | 1 | 1 |
| 07 | 2230 | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 3/7/14 | 0 | 0 | 1 | 26 | 0 | 0 | 0 | 0 | 1 | 1 |
| 08 | | | | | | | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | 2210 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 38 | 1 | 46 | 0 | 0 | 0 | 0 | 4 | 1/1/1/2 |
| 19 | 2225 | 1 | 1 | 1 | 2 | 0 | 0 | 3 | 2/9/9 | 1 | 41 | 1 | 32 | 0 | 0 | 1 | 1 | 2 | 1/2 |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | 2200 | 1 | 1 | 0 | 0 | 2 | 3/4 | 2 | 5/14 | 1 | 29 | 1 | 21 | 0 | 0 | 1 | 1 | 1 | 1 |
| 22 | 2245 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 7/13 | 1 | 17 | 1 | 9 | 0 | 0 | 1 | 1 | 2 | 1/1 |
| 23 | 2225 | 2 | 1/1 | 0 | 0 | 1 | 4 | 1 | 5 | 1 | 14 | 1 | 7 | 0 | 0 | 1 | 1 | 1 | 1 |
| 24 | 2225 | 1 | 1 | 0 | 0 | 1 | 4 | 0 | 0 | 1 | 11 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 1/1/1 |
| 25 | 2255 | 0 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | 2240 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 8 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | — | 8 | 8 | 4 | 9 | 8 | 24 | 15 | 135 | 7 | 159 | 9 | 234 | 1 | 2 | 4 | 4 | 21 | 23 |
| REGIONAL PERCENTAGES | | | | | | | | | | | | | | | | | | | |
| A | B | C | D | E | F | G | H | J | ?g | | | | | | | | | | |
| 10.4 | 5.2 | 10.4 | 19.5 | 9.1 | 11.7 | 1.3 | 5.2 | 27.3 | 77 | | | | | | | | | | |
| NOBS = 12 | | | | $\overline{p/g}$ mean = 2.1393 | | | | | | $\overline{f/g}$ mean = 8.6216 | | | | | | | | | |
| | | | | $\overline{p/g}$ mean = 1.9481 | | | | | | $\overline{f/g}$ mean = 7.7662 | | | | | | | | | |
| GROUP COMPLEXITY INDEX (GCI) = 9.7143 | | | | | | | | | | | | | | | | | | | |

Georgi Dobrovolski Solar Observatory

SMOOTHED RESULTS OF OBSERVED VALUES FOR THE LAST 12 MONTHS (OBTAINABLE) USING THE WALDMEIER & BARNES-13 METHODS.

DATA BELOW ARE PRELIMINARY. FINAL VALUES WILL BE PUBLISHED IN THE GDSO ANNUAL REPORTS.

WALDMEIER METHOD

| MONTH | $g(S^w)$ | $WN(S^w)$ | $SN(S^w)$ | $BX(S^w)$ | $CV(S^w)$ | $QC(S^w)$ | $IS(S^w)$ |
|---------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 2002 FEBRUARY | 9.35 | 156.18 | 199.58 | 1508.3 | 186.49 | 30.04 | 69.31 |
| MARCH | 9.28 | 155.62 | 198.73 | 1505.9 | 185.22 | 29.81 | 69.44 |
| APRIL | 9.15 | 153.37 | 196.02 | 1476.5 | 181.17 | 29.24 | 68.37 |
| MAY | 9.03 | 151.55 | 195.32 | 1467.9 | 179.03 | 28.89 | 67.66 |
| JUNE | 8.78 | 146.77 | 189.58 | 1420.1 | 173.86 | 28.11 | 65.19 |
| JULY | 8.49 | 141.03 | 180.68 | 1341.4 | 165.59 | 27.02 | 62.07 |
| AUGUST | 8.26 | 135.98 | 172.48 | 1261.2 | 158.58 | 25.99 | 59.16 |
| SEPTEMBER | 7.97 | 130.68 | 165.10 | 1197.0 | 153.84 | 24.94 | 56.49 |
| OCTOBER | 7.67 | 125.50 | 158.44 | 1141.3 | 149.33 | 23.91 | 54.09 |
| NOVEMBER | 7.24 | 118.58 | 149.12 | 1070.6 | 141.32 | 22.49 | 51.12 |
| DECEMBER | 6.87 | 113.99 | 143.55 | 1054.5 | 134.37 | 21.39 | 50.07 |
| 2003 JANUARY | 6.70 | 111.33 | 139.67 | 1025.9 | 130.98 | 20.89 | 49.03 |

BARNES-13 METHOD

| MONTH | $g(S^{B13})$ | $WN(S^{B13})$ | $SN(S^{B13})$ | $BX(S^{B13})$ | $CV(S^{B13})$ | $QC(S^{B13})$ | $IS(S^{B13})$ |
|---------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 2002 FEBRUARY | 9.36 | 153.64 | 195.76 | 1426.3 | 182.20 | 30.00 | 66.73 |
| MARCH | 9.26 | 152.50 | 194.87 | 1426.0 | 180.44 | 29.69 | 66.49 |
| APRIL | 9.19 | 152.11 | 195.10 | 1438.7 | 179.61 | 29.42 | 66.73 |
| MAY | 9.10 | 151.78 | 195.65 | 1462.1 | 179.48 | 29.12 | 67.22 |
| JUNE | 8.90 | 149.77 | 193.63 | 1473.0 | 177.57 | 28.48 | 67.06 |
| JULY | 8.65 | 146.84 | 189.67 | 1462.8 | 173.66 | 27.66 | 66.36 |
| AUGUST | 8.43 | 143.01 | 183.85 | 1415.2 | 168.42 | 26.78 | 64.62 |
| SEPTEMBER | 8.13 | 137.03 | 175.09 | 1329.4 | 161.27 | 25.65 | 61.34 |
| OCTOBER | 7.75 | 128.96 | 163.61 | 1214.9 | 152.05 | 24.25 | 56.83 |
| NOVEMBER | 7.29 | 119.51 | 150.09 | 1080.1 | 140.95 | 22.64 | 51.58 |
| DECEMBER | 6.88 | 110.96 | 137.75 | 957.8 | 130.18 | 21.17 | 46.90 |
| 2003 JANUARY | 6.54 | 103.97 | 127.63 | 856.1 | 121.91 | 19.99 | 43.03 |