
# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

# MONTHLY SUNSPOT REPORTS

# 2000

**CONTENTS:**

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

GDSO

## SUNSPOT RESULTS FOR JANUARY 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | |
| 03 | 2135 | 5 | 23 | 73 | 6 | 8 | 68 | 464 | 58 | 2.0 | 3.0 | 3.0 | 3706 |
| 04 | 2040 | 7 | 29 | 99 | 8 | 16 | 96 | 473 | 91 | 2.0 | 2.5 | 2.5 | 3707 |
| 05 | | | | | | | | | | | | | |
| 06 | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | |
| 08 | 2010 | 7 | 17 | 87 | 9 | 7 | 97 | 455 | 100 | 2.0 | 2.0 | 2.0 | 3708 |
| 09 | 2020 | 5 | 20 | 70 | 5 | 13 | 63 | 241 | 60 | 2.0 | 2.5 | 2.5 | 3709 |
| 10 | | | | | | | | | | | | | |
| 11 | 2040 | 8 | 53 | 133 | 15 | 26 | 176 | 1064 | 142 | 2.0 | 3.0 | 3.0 | 3710 |
| 12 | | | | | | | | | | | | | |
| 13 | 2050 | 11 | 69 | 179 | 13 | 32 | 162 | 1419 | 168 | 1.5 | 2.0 | 2.0 | 3711 |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | 2025 | 12 | 74 | 194 | 13 | 38 | 168 | 1277 | 174 | 1.0 | 2.0 | 2.0 | 3712 |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | 2045 | 6 | 49 | 109 | 13 | 21 | 151 | 998 | 129 | 1.5 | 2.0 | 2.0 | 3713 |
| 20 | 2100 | 8 | 47 | 127 | 10 | 25 | 125 | 918 | 106 | 2.5 | 2.5 | 2.5 | 3714 |
| 21 | 2045 | 8 | 43 | 123 | 10 | 25 | 125 | 732 | 163 | 1.5 | 1.5 | 2.0 | 3715 |
| 22 | 2055 | 8 | 32 | 112 | 10 | 16 | 116 | 508 | 128 | 1.5 | 2.0 | 2.5 | 3716 |
| 23 | 2025 | 6 | 19 | 79 | 4 | 15 | 55 | 182 | 50 | 1.5 | 3.0 | 3.0 | 3717 |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | 2020 | 7 | 18 | 88 | 4 | 12 | 52 | 166 | 49 | 2.0 | 2.0 | 2.5 | 3718 |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 98 | 493 | 1473 | 120 | 254 | 1454 | 8897 | 1418 | 23.0 | 30.0 | 31.5 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 7.54 | 37.92 | 113.31 | 9.23 | 19.54 | 111.85 | 684.38 | 109.08 | 1.77 | 2.31 | 2.42 | —— |

MEAN WEIGHT = 0.4738 MEAN CONDITION = 2.1667 QUALITY COUNT = 21.54

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# JANUARY 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | | | | | | | | | | | |
| 03 | 2135 | 27 | 4 | 15 | 7 | 0 | 1 | 2.0 | 3.0 | 3.0 | 3706 |
| 04 | 2040 | 35 | 6 | 13 | 15 | 0 | 1 | 2.0 | 2.5 | 2.5 | 3707 |
| 05 | | | | | | | | | | | |
| 06 | | | | | | | | | | | |
| 07 | | | | | | | | | | | |
| 08 | 2010 | 20 | 3 | 7 | 6 | 3 | 1 | 2.0 | 2.0 | 2.0 | 3708 |
| 09 | 2020 | 24 | 4 | 7 | 12 | 0 | 1 | 2.0 | 2.5 | 2.5 | 3709 |
| 10 | | | | | | | | | | | |
| 11 | 2040 | 59 | 6 | 26 | 25 | 1 | 1 | 2.0 | 3.0 | 3.0 | 3710 |
| 12 | | | | | | | | | | | |
| 13 | 2050 | 76 | 7 | 35 | 30 | 2 | 2 | 1.5 | 2.0 | 2.0 | 3711 |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | 2025 | 80 | 6 | 33 | 35 | 3 | 3 | 1.0 | 2.0 | 2.0 | 3712 |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | 2045 | 54 | 5 | 27 | 21 | 1 | 0 | 1.5 | 2.0 | 2.0 | 3713 |
| 20 | 2100 | 53 | 6 | 21 | 24 | 1 | 1 | 2.5 | 2.5 | 2.5 | 3714 |
| 21 | 2045 | 49 | 6 | 17 | 24 | 1 | 1 | 1.5 | 1.5 | 2.0 | 3715 |
| 22 | 2055 | 37 | 5 | 14 | 15 | 2 | 1 | 1.5 | 2.0 | 2.5 | 3716 |
| 23 | 2025 | 23 | 4 | 2 | 15 | 2 | 0 | 1.5 | 3.0 | 3.0 | 3717 |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | 2020 | 23 | 5 | 6 | 10 | 0 | 2 | 2.0 | 2.0 | 2.5 | 3718 |
| 31 | | | | | | | | | | | |
| Σ | —— | 560 | 67 | 223 | 239 | 16 | 15 | 23.0 | 30.0 | 31.5 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 43.08 | 5.15 | 17.15 | 18.38 | 1.23 | 1.15 | 1.77 | 2.31 | 2.42 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# JANUARY 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | | | | | | | |
| 03 | 2135 | 1 | 1 | 0 | 0 | 1 | 5 | 2 | 4/7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 |
| 04 | 2040 | 1 | 1 | 0 | 0 | 3 | 2/4/6 | 1 | 9 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | | | | | | | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | 2010 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | 4 | 0 | 0 | 1 | 7 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 09 | 2020 | 1 | 1 | 0 | 0 | 3 | 3/4/7 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | 2040 | 1 | 1 | 1 | 2 | 1 | 7 | 2 | 5/8 | 2 | 10/19 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | 2050 | 2 | 1/1 | 0 | 0 | 3 | 4/4/5 | 2 | 5/8 | 1 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/2 |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | 2025 | 3 | 1/1/1 | 2 | 2/3 | 0 | 0 | 4 | 6/10/15/32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | 2045 | 0 | 0 | 0 | 0 | 1 | 5 | 3 | 5/8/9 | 1 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 20 | 2100 | 1 | 1 | 1 | 3 | 2 | 3/5 | 1 | 7 | 2 | 13/14 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 21 | 2045 | 1 | 1 | 0 | 0 | 3 | 2/2/7 | 2 | 8/13 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 22 | 2055 | 1 | 1 | 0 | 0 | 3 | 3/3/6 | 1 | 13 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 23 | 2025 | 0 | 0 | 2 | 3/4 | 2 | 3/7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | 2020 | 2 | 1/1 | 2 | 2/3 | 2 | 2/4 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 15 | 15 | 8 | 22 | 25 | 105 | 20 | 181 | 10 | 136 | 1 | 7 | 0 | 0 | 0 | 0 | 19 | 27 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 15.3 | 8.2 | 25.5 | 20.4 | 10.2 | 1.0 | 0.0 | 0.0 | 19.4 | 98 |

NOBS = 13 $\overline{p / g}$ mean = 1.2249 $\overline{f / g}$ mean = 4.8762

$\overline{p} / \overline{g}$ mean = 1.2245 $\overline{f} / \overline{g}$ mean = 5.0306

GROUP COMPLEXITY INDEX (GCI) = 6.2551


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1998 AUGUST | 4.58 | 72.22 | 74.09 | 478.4 | 75.49 | 12.74 | 29.58 |
| SEPTEMBER | 4.73 | 74.30 | 76.38 | 495.4 | 78.30 | 13.22 | 30.19 |
| OCTOBER | 4.83 | 76.07 | 78.76 | 519.4 | 79.77 | 13.59 | 31.04 |
| NOVEMBER | 5.05 | 79.30 | 82.53 | 542.3 | 83.78 | 14.31 | 32.27 |
| DECEMBER | 5.41 | 84.82 | 88.63 | 582.7 | 90.79 | 15.43 | 34.43 |
| 1999 JANUARY | 5.72 | 90.54 | 96.27 | 654.6 | 97.92 | 16.56 | 37.27 |
| FEBRUARY | 5.81 | 92.95 | 100.30 | 712.1 | 100.93 | 17.06 | 38.83 |
| MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1998 AUGUST | 4.90 | 76.45 | 76.82 | 489.4 | 79.81 | 13.58 | 30.85 |
| SEPTEMBER | 4.99 | 77.92 | 78.86 | 508.8 | 80.93 | 13.89 | 31.39 |
| OCTOBER | 5.01 | 78.36 | 80.24 | 524.3 | 81.04 | 14.00 | 31.62 |
| NOVEMBER | 5.04 | 79.03 | 82.30 | 543.4 | 82.17 | 14.19 | 32.07 |
| DECEMBER | 5.12 | 80.69 | 85.50 | 572.4 | 84.84 | 14.56 | 33.05 |
| 1999 JANUARY | 5.25 | 83.40 | 89.68 | 611.5 | 88.97 | 15.14 | 34.48 |
| FEBRUARY | 5.44 | 86.74 | 94.22 | 655.6 | 93.98 | 15.87 | 36.11 |
| MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

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## SUNSPOT RESULTS FOR FEBRUARY 2000

**All observations carried out by HOWARD BARNES .**
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**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
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**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 2035 | 5 | 17 | 67 | 6 | 9 | 69 | 373 | 68 | 2.0 | 2.5 | 2.5 | 3719 |
| 02 | 2100 | 5 | 18 | 68 | 5 | 10 | 60 | 402 | 56 | 2.5 | 3.0 | 2.5 | 3720 |
| 03 | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | |
| 05 | 2225 | 9 | 37 | 127 | 12 | 21 | 141 | 661 | 130 | 2.0 | 2.5 | 3.0 | 3721 |
| 06 | 2130 | 12 | 54 | 174 | 17 | 26 | 196 | 1162 | 226 | 1.5 | 2.0 | 2.0 | 3722 |
| 07 | | | | | | | | | | | | | |
| 08 | 2045 | 8 | 36 | 116 | 9 | 18 | 108 | 849 | 109 | 2.0 | 2.5 | 2.5 | 3723 |
| 09 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 11 | 2050 | 11 | 39 | 149 | 12 | 23 | 143 | 577 | 162 | 1.5 | 1.5 | 2.0 | 3724 |
| 12 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | 2140 | 10 | 45 | 145 | 13 | 21 | 151 | 752 | 139 | 1.5 | 2.0 | 2.0 | 3725 |
| 17 | 2225 | 9 | 33 | 123 | 11 | 14 | 124 | 738 | 135 | 2.0 | 2.5 | 2.0 | 3726 |
| 18 | | | | | | | | | | | | | |
| 19 | 2030 | 5 | 36 | 86 | 9 | 16 | 106 | 1145 | 88 | 2.0 | 2.0 | 2.5 | 3727 |
| 20 | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | |
| 22 | 2155 | 7 | 34 | 104 | 10 | 13 | 113 | 606 | 165 | 1.5 | 2.5 | 2.5 | 3728 |
| 23 | 2010 | 8 | 38 | 118 | 10 | 20 | 120 | 548 | 139 | 1.5 | 2.0 | 2.5 | 3729 |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | 2020 | 11 | 91 | 201 | 20 | 25 | 225 | 2036 | 296 | 2.0 | 2.0 | 2.0 | 3730 |
| 27 | | | | | | | | | | | | | |
| 28 | 2035 | 10 | 91 | 191 | 18 | 22 | 202 | 2220 | 270 | 2.5 | 3.5 | 4.0 | 3731 |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 110 | 569 | 1669 | 152 | 238 | 1758 | 12069 | 1983 | 24.5 | 30.5 | 32.0 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 8.46 | 43.77 | 128.38 | 11.69 | 18.31 | 135.23 | 928.38 | 152.54 | 1.88 | 2.35 | 2.46 | —— |

MEAN WEIGHT = 0.4621 MEAN CONDITION = 2.2308 QUALITY COUNT = 25.46

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# FEBRUARY 2000

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**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
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**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 2035 | 20 | 3 | 6 | 9 | 2 | 0 | 2.0 | 2.5 | 2.5 | 3719 |
| 02 | 2100 | 20 | 2 | 6 | 9 | 2 | 1 | 2.5 | 3.0 | 2.5 | 3720 |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | 2225 | 44 | 7 | 15 | 20 | 1 | 1 | 2.0 | 2.5 | 3.0 | 3721 |
| 06 | 2130 | 64 | 10 | 27 | 25 | 1 | 1 | 1.5 | 2.0 | 2.0 | 3722 |
| 07 | | | | | | | | | | | |
| 08 | 2045 | 42 | 6 | 17 | 17 | 1 | 1 | 2.0 | 2.5 | 2.5 | 3723 |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | 2050 | 48 | 9 | 14 | 23 | 2 | 0 | 1.5 | 1.5 | 2.0 | 3724 |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | 2140 | 51 | 6 | 22 | 19 | 2 | 2 | 1.5 | 2.0 | 2.0 | 3725 |
| 17 | 2225 | 37 | 4 | 15 | 13 | 4 | 1 | 2.0 | 2.5 | 2.0 | 3726 |
| 18 | | | | | | | | | | | |
| 19 | 2030 | 39 | 3 | 18 | 16 | 2 | 0 | 2.0 | 2.0 | 2.5 | 3727 |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | 2155 | 39 | 5 | 19 | 13 | 2 | 0 | 1.5 | 2.5 | 2.5 | 3728 |
| 23 | 2010 | 43 | 5 | 16 | 19 | 2 | 1 | 1.5 | 2.0 | 2.5 | 3729 |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | 2020 | 100 | 9 | 65 | 24 | 1 | 1 | 2.0 | 2.0 | 2.0 | 3730 |
| 27 | | | | | | | | | | | |
| 28 | 2035 | 98 | 7 | 68 | 20 | 1 | 2 | 2.5 | 3.5 | 4.0 | 3731 |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| Σ | —— | 645 | 76 | 308 | 227 | 23 | 11 | 24.5 | 30.5 | 32.0 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 49.62 | 5.85 | 23.69 | 17.46 | 1.77 | 0.85 | 1.88 | 2.35 | 2.46 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# FEBRUARY 2000

**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 | 2035 | 0 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 02 | 2100 | 1 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | 2225 | 1 | 1 | 0 | 0 | 2 | 2/7 | 3 | 4/6/8 | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 06 | 2130 | 1 | 1 | 1 | 2 | 1 | 3 | 5 | 4/6/7/8/13 | 0 | 0 | 0 | 0 | 1 | 5 | 1 | 1 | 2 | 2/2 |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | 2045 | 1 | 1 | 1 | 2 | 1 | 4 | 1 | 8 | 1 | 14 | 0 | 0 | 1 | 4 | 0 | 0 | 2 | 1/2 |
| 09 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | 2050 | 0 | 0 | 3 | 2/3/7 | 2 | 2/2 | 3 | 3/6/10 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1/2 |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | 2140 | 2 | 1/1 | 1 | 2 | 1 | 4 | 4 | 5/5/9/16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 17 | 2225 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 4 | 1 | 19 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1/1/1 |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | 2030 | 0 | 0 | 2 | 2/3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 29 | 0 | 0 | 1 | 1 | 1 | 1 |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | 2155 | 0 | 0 | 1 | 2 | 1 | 3 | 3 | 6/9/12 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 | 0 | 0 |
| 23 | 2010 | 1 | 1 | 0 | 0 | 3 | 5/5/6 | 2 | 6/13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | 2020 | 1 | 1 | 1 | 2 | 3 | 2/2/4 | 2 | 9/11 | 2 | 18/33 | 1 | 8 | 0 | 0 | 0 | 0 | 1 | 1 |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | 2035 | 2 | 1/1 | 0 | 0 | 1 | 2 | 3 | 4/6/7 | 2 | 27/31 | 1 | 11 | 0 | 0 | 1 | 1 | 0 | 0 |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 11 | 11 | 12 | 31 | 18 | 61 | 27 | 205 | 9 | 171 | 3 | 48 | 2 | 9 | 7 | 7 | 21 | 26 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 10.0 | 10.9 | 16.4 | 24.5 | 8.2 | 2.7 | 1.8 | 6.4 | 19.1 | 110 |

NOBS = 13 $\overline{p / g}$ mean = 1.3681 $\overline{f / g}$ mean = 5.0772

$\overline{p} / \overline{g}$ mean = 1.3818 $\overline{f} / \overline{g}$ mean = 5.1727

GROUP COMPLEXITY INDEX (GCI) = 6.5545


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1998 SEPTEMBER | 4.73 | 74.30 | 76.38 | 495.4 | 78.30 | 13.22 | 30.19 |
| OCTOBER | 4.83 | 76.07 | 78.76 | 519.4 | 79.77 | 13.59 | 31.04 |
| NOVEMBER | 5.05 | 79.30 | 82.53 | 542.3 | 83.78 | 14.31 | 32.27 |
| DECEMBER | 5.41 | 84.82 | 88.63 | 582.7 | 90.79 | 15.43 | 34.43 |
| 1999 JANUARY | 5.72 | 90.54 | 96.27 | 654.6 | 97.92 | 16.56 | 37.27 |
| FEBRUARY | 5.81 | 92.95 | 100.30 | 712.1 | 100.93 | 17.06 | 38.83 |
| MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1998 SEPTEMBER | 4.99 | 77.92 | 78.86 | 508.8 | 80.93 | 13.89 | 31.39 |
| OCTOBER | 5.01 | 78.36 | 80.24 | 524.3 | 81.04 | 14.00 | 31.62 |
| NOVEMBER | 5.04 | 79.03 | 82.30 | 543.4 | 82.17 | 14.19 | 32.07 |
| DECEMBER | 5.12 | 80.69 | 85.50 | 572.4 | 84.84 | 14.56 | 33.05 |
| 1999 JANUARY | 5.25 | 83.40 | 89.68 | 611.5 | 88.97 | 15.14 | 34.48 |
| FEBRUARY | 5.44 | 86.74 | 94.22 | 655.6 | 93.98 | 15.87 | 36.11 |
| MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

GDSO

## SUNSPOT RESULTS FOR MARCH 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | 2030 | 8 | 81 | 161 | 14 | 30 | 170 | 1953 | 197 | 2.5 | 2.5 | 2.5 | 3732 |
| 03 | 2110 | 7 | 60 | 130 | 13 | 28 | 158 | 1153 | 181 | 2.0 | 2.5 | 2.5 | 3733 |
| 04 | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | |
| 06 | 2030 | 9 | 79 | 169 | 13 | 40 | 170 | 1805 | 205 | 2.0 | 3.5 | 3.5 | 3734 |
| 07 | | | | | | | | | | | | | |
| 08 | 2120 | 11 | 68 | 178 | 20 | 27 | 227 | 1618 | 268 | 2.0 | 2.5 | 3.0 | 3735 |
| 09 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | 2210 | 7 | 58 | 128 | 9 | 19 | 109 | 951 | 148 | 2.0 | 2.5 | 2.5 | 3736 |
| 15 | 2030 | 6 | 61 | 121 | 10 | 23 | 123 | 1268 | 130 | 1.5 | 2.0 | 2.5 | 3737 |
| 16 | 2030 | 8 | 62 | 142 | 13 | 19 | 149 | 1242 | 143 | 2.0 | 2.0 | 2.0 | 3738 |
| 17 | 2045 | 6 | 69 | 129 | 12 | 27 | 147 | 1397 | 141 | 1.5 | 1.5 | 2.0 | 3739 |
| 18 | | | | | | | | | | | | | |
| 19 | 2030 | 8 | 99 | 179 | 21 | 35 | 245 | 2443 | 269 | 2.0 | 2.0 | 2.0 | 3740 |
| 20 | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | |
| 22 | 2025 | 12 | 110 | 230 | 22 | 48 | 268 | 3163 | 337 | 2.0 | 2.0 | 2.0 | 3741 |
| 23 | 2055 | 15 | 96 | 246 | 29 | 45 | 335 | 2624 | 413 | 2.0 | 2.5 | 2.5 | 3742 |
| 24 | 2100 | 14 | 85 | 225 | 25 | 34 | 284 | 1738 | 327 | 2.5 | 2.5 | 2.5 | 3743 |
| 25 | | | | | | | | | | | | | |
| 26 | 2035 | 13 | 97 | 227 | 24 | 39 | 279 | 2558 | 245 | 1.0 | 1.5 | 2.0 | 3744 |
| 27 | 2040 | 12 | 83 | 203 | 24 | 32 | 272 | 1729 | 273 | 1.5 | 2.0 | 2.5 | 3745 |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | 2045 | 12 | 79 | 199 | 19 | 28 | 218 | 1483 | 176 | 1.5 | 2.0 | 2.0 | 3746 |
| 31 | 2100 | 13 | 118 | 248 | 22 | 49 | 269 | 2265 | 243 | 1.5 | 2.5 | 2.5 | 3747 |
| Σ | —— | 161 | 1305 | 2915 | 290 | 523 | 3423 | 29390 | 3696 | 29.5 | 36 | 38.5 | —— |
| NOBS | —— | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | —— |
| MNS | —— | 10.06 | 81.56 | 182.19 | 18.12 | 32.69 | 213.94 | 1836.88 | 231.00 | 1.84 | 2.25 | 2.41 | —— |

MEAN WEIGHT = 0.4745 MEAN CONDITION = 2.1667 QUALITY COUNT = 34.00

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# MARCH 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | 2030 | 88 | 7 | 50 | 30 | 1 | 0 | 2.5 | 2.5 | 2.5 | 3732 |
| 03 | 2110 | 66 | 6 | 32 | 27 | 0 | 1 | 2.0 | 2.5 | 2.5 | 3733 |
| 04 | | | | | | | | | | | |
| 05 | | | | | | | | | | | |
| 06 | 2030 | 84 | 5 | 38 | 37 | 1 | 3 | 2.0 | 3.5 | 3.5 | 3734 |
| 07 | | | | | | | | | | | |
| 08 | 2120 | 76 | 8 | 38 | 27 | 3 | 0 | 2.0 | 2.5 | 3.0 | 3735 |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | 2210 | 64 | 6 | 38 | 19 | 1 | 0 | 2.0 | 2.5 | 2.5 | 3736 |
| 15 | 2030 | 66 | 5 | 38 | 22 | 0 | 1 | 1.5 | 2.0 | 2.5 | 3737 |
| 16 | 2030 | 67 | 5 | 42 | 17 | 1 | 2 | 2.0 | 2.0 | 2.0 | 3738 |
| 17 | 2045 | 73 | 4 | 40 | 27 | 2 | 0 | 1.5 | 1.5 | 2.0 | 3739 |
| 18 | | | | | | | | | | | |
| 19 | 2030 | 107 | 8 | 64 | 35 | 0 | 0 | 2.0 | 2.0 | 2.0 | 3740 |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | 2025 | 119 | 9 | 60 | 47 | 2 | 1 | 2.0 | 2.0 | 2.0 | 3741 |
| 23 | 2055 | 107 | 11 | 49 | 43 | 2 | 2 | 2.0 | 2.5 | 2.5 | 3742 |
| 24 | 2100 | 95 | 10 | 49 | 32 | 2 | 2 | 2.5 | 2.5 | 2.5 | 3743 |
| 25 | | | | | | | | | | | |
| 26 | 2035 | 106 | 9 | 56 | 37 | 2 | 2 | 1.0 | 1.5 | 2.0 | 3744 |
| 27 | 2040 | 93 | 10 | 49 | 32 | 2 | 0 | 1.5 | 2.0 | 2.5 | 3745 |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | 2045 | 86 | 7 | 48 | 26 | 3 | 2 | 1.5 | 2.0 | 2.0 | 3746 |
| 31 | 2100 | 129 | 11 | 68 | 48 | 1 | 1 | 1.5 | 2.5 | 2.5 | 3747 |
| Σ | —— | 1426 | 121 | 759 | 506 | 23 | 17 | 29.5 | 36 | 38.5 | —— |
| NOBS | —— | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | —— |
| MNS | —— | 89.12 | 7.56 | 47.44 | 31.62 | 1.44 | 1.06 | 1.84 | 2.25 | 2.41 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# MARCH 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | 2030 | 0 | 0 | 2 | 3/3 | 1 | 2 | 1 | 8 | 2 | 22/30 | 1 | 12 | 0 | 0 | 0 | 0 | 1 | 1 |
| 03 | 2110 | 1 | 1 | 0 | 0 | 3 | 3/4/6 | 1 | 26 | 1 | 13 | 1 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | 2030 | 3 | 1/1/1 | 1 | 2 | 0 | 0 | 1 | 11 | 3 | 18/21/23 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | 2120 | 0 | 0 | 1 | 3 | 2 | 2/4 | 3 | 2/5/13 | 1 | 19 | 1 | 17 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 09 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | 2210 | 0 | 0 | 1 | 3 | 3 | 2/2/3 | 2 | 10/37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 15 | 2030 | 1 | 1 | 1 | 2 | 1 | 4 | 2 | 3/15 | 1 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 2030 | 2 | 1/1 | 0 | 0 | 2 | 2/2 | 2 | 7/23 | 1 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 17 | 2045 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 11/32 | 1 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | 2030 | 0 | 0 | 0 | 0 | 2 | 2/3 | 2 | 9/14 | 2 | 10/43 | 1 | 16 | 0 | 0 | 1 | 2 | 0 | 0 |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | 2025 | 1 | 1 | 3 | 2/2/3 | 0 | 0 | 0 | 0 | 3 | 13/16/21 | 3 | 9/18/23 | 0 | 0 | 1 | 1 | 1 | 1 |
| 23 | 2055 | 2 | 1/1 | 1 | 2 | 1 | 2 | 3 | 7/7/11 | 1 | 19 | 4 | 7/9/12/14 | 0 | 0 | 1 | 1 | 2 | 1/2 |
| 24 | 2100 | 2 | 1/1 | 0 | 0 | 4 | 2/2/4/5 | 3 | 7/11/13 | 2 | 8/24 | 1 | 5 | 0 | 0 | 2 | 1/1 | 0 | 0 |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | 2035 | 2 | 1/1 | 1 | 3 | 2 | 2/5 | 2 | 3/7 | 2 | 16/21 | 2 | 13/23 | 0 | 0 | 1 | 1 | 1 | 1 |
| 27 | 2040 | 0 | 0 | 1 | 2 | 4 | 2/2/2/3 | 2 | 4/22 | 3 | 11/15/18 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | 2045 | 2 | 1/1 | 1 | 2 | 2 | 3/11 | 3 | 8/13/21 | 1 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 31 | 2100 | 1 | 1 | 2 | 3/4 | 3 | 2/3/8 | 3 | 9/13/22 | 3 | 13/18/21 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| TOTALS | —— | 17 | 17 | 15 | 39 | 31 | 102 | 32 | 404 | 27 | 531 | 14 | 185 | 0 | 0 | 7 | 8 | 18 | 19 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 10.6 | 9.3 | 19.3 | 19.9 | 16.8 | 8.7 | 0.0 | 4.3 | 11.2 | 161 |

NOBS = 16 $\overline{p / g}$ mean = 1.7966 $\overline{f / g}$ mean = 8.4631

$\overline{p} / \overline{g}$ mean = 1.8012 $\overline{f} / \overline{g}$ mean = 8.1056

GROUP COMPLEXITY INDEX (GCI) = 9.9068


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1998 OCTOBER | 4.83 | 76.07 | 78.76 | 519.4 | 79.77 | 13.59 | 31.04 |
| NOVEMBER | 5.05 | 79.30 | 82.53 | 542.3 | 83.78 | 14.31 | 32.27 |
| DECEMBER | 5.41 | 84.82 | 88.63 | 582.7 | 90.79 | 15.43 | 34.43 |
| 1999 JANUARY | 5.72 | 90.54 | 96.27 | 654.6 | 97.92 | 16.56 | 37.27 |
| FEBRUARY | 5.81 | 92.95 | 100.30 | 712.1 | 100.93 | 17.06 | 38.83 |
| MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1998 OCTOBER | 5.01 | 78.36 | 80.24 | 524.3 | 81.04 | 14.00 | 31.62 |
| NOVEMBER | 5.04 | 79.03 | 82.30 | 543.4 | 82.17 | 14.19 | 32.07 |
| DECEMBER | 5.12 | 80.69 | 85.50 | 572.4 | 84.84 | 14.56 | 33.05 |
| 1999 JANUARY | 5.25 | 83.40 | 89.68 | 611.5 | 88.97 | 15.14 | 34.48 |
| FEBRUARY | 5.44 | 86.74 | 94.22 | 655.6 | 93.98 | 15.87 | 36.11 |
| MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

## SUNSPOT RESULTS FOR APRIL 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | 2035 | 14 | 94 | 234 | 25 | 30 | 280 | 1675 | 287 | 2.0 | 2.0 | 2.0 | 3748 |
| 03 | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | |
| 06 | | | | | | | | | | | | | |
| 07 | 2055 | 8 | 35 | 115 | 10 | 16 | 116 | 504 | 89 | 1.5 | 2.0 | 2.0 | 3749 |
| 08 | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | 2240 | 9 | 38 | 128 | 10 | 22 | 122 | 800 | 94 | 1.0 | 2.0 | 2.0 | 3750 |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | |
| 21 | 2040 | 11 | 76 | 186 | 20 | 25 | 225 | 1812 | 254 | 1.5 | 2.0 | 2.5 | 3751 |
| 22 | | | | | | | | | | | | | |
| 23 | 2050 | 11 | 150 | 260 | 23 | 43 | 273 | 4441 | 270 | 2.0 | 2.0 | 2.0 | 3752 |
| 24 | 2110 | 11 | 131 | 241 | 23 | 37 | 267 | 3497 | 255 | 2.0 | 2.0 | 2.5 | 3753 |
| 25 | 2045 | 8 | 107 | 187 | 21 | 35 | 245 | 2907 | 242 | 2.5 | 2.5 | 2.5 | 3754 |
| 26 | 2105 | 7 | 103 | 173 | 15 | 36 | 186 | 2844 | 199 | 1.0 | 2.0 | 2.5 | 3755 |
| 27 | | | | | | | | | | | | | |
| 28 | 2125 | 8 | 73 | 153 | 13 | 29 | 159 | 1563 | 181 | 1.5 | 2.0 | 2.5 | 3756 |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 87 | 807 | 1677 | 160 | 273 | 1873 | 20043 | 1871 | 15.0 | 18.5 | 20.5 | —— |
| NOBS | —— | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | —— |
| MNS | —— | 9.67 | 89.67 | 186.33 | 17.78 | 30.33 | 208.11 | 2227.00 | 207.89 | 1.67 | 2.06 | 2.28 | —— |

MEAN WEIGHT = 0.5058 MEAN CONDITION = 2.0000 QUALITY COUNT = 33.78

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# APRIL 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | 2035 | 104 | 10 | 61 | 29 | 3 | 1 | 2.0 | 2.0 | 2.0 | 3748 |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | | | | | | | | | | | |
| 06 | | | | | | | | | | | |
| 07 | 2055 | 40 | 5 | 17 | 15 | 2 | 1 | 1.5 | 2.0 | 2.0 | 3749 |
| 08 | | | | | | | | | | | |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | 2240 | 43 | 5 | 13 | 21 | 3 | 1 | 1.0 | 2.0 | 2.0 | 3750 |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | 2040 | 85 | 9 | 50 | 24 | 1 | 1 | 1.5 | 2.0 | 2.5 | 3751 |
| 22 | | | | | | | | | | | |
| 23 | 2050 | 157 | 7 | 105 | 41 | 2 | 2 | 2.0 | 2.0 | 2.0 | 3752 |
| 24 | 2110 | 139 | 8 | 93 | 35 | 1 | 2 | 2.0 | 2.0 | 2.5 | 3753 |
| 25 | 2045 | 115 | 8 | 72 | 35 | 0 | 0 | 2.5 | 2.5 | 2.5 | 3754 |
| 26 | 2105 | 110 | 7 | 67 | 36 | 0 | 0 | 1.0 | 2.0 | 2.5 | 3755 |
| 27 | | | | | | | | | | | |
| 28 | 2125 | 79 | 6 | 43 | 28 | 1 | 1 | 1.5 | 2.0 | 2.5 | 3756 |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| Σ | —— | 872 | 65 | 521 | 264 | 13 | 9 | 15.0 | 18.5 | 20.5 | —— |
| NOBS | —— | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | —— |
| MNS | —— | 96.89 | 7.22 | 57.89 | 29.33 | 1.44 | 1.00 | 1.67 | 2.06 | 2.28 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# APRIL 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | 2035 | 1 | 1 | 0 | 0 | 2 | 2/4 | 8 | 3/7/8/8/10 12/13/23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | | | | | | | | | | | | | | | | | | | |
| 07 | 2055 | 1 | 1 | 0 | 0 | 4 | 2/4/4/5 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 08 | | | | | | | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | 2240 | 1 | 1 | 1 | 2 | 1 | 7 | 1 | 4 | 1 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1/1/1/2 |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | 2040 | 1 | 1 | 1 | 3 | 1 | 3 | 3 | 7/9/12 | 2 | 8/11 | 2 | 9/12 | 0 | 0 | 0 | 0 | 1 | 1 |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | 2050 | 2 | 1/1 | 0 | 0 | 0 | 0 | 3 | 11/12/14 | 1 | 21 | 3 | 22/25/41 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 24 | 2110 | 2 | 1/1 | 1 | 2 | 0 | 0 | 3 | 6/7/11 | 2 | 16/44 | 2 | 15/27 | 0 | 0 | 0 | 0 | 1 | 1 |
| 25 | 2045 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 6/6/7 | 2 | 14/41 | 2 | 12/19 | 0 | 0 | 0 | 0 | 1 | 2 |
| 26 | 2105 | 0 | 0 | 0 | 0 | 2 | 2/5 | 1 | 3 | 2 | 11/55 | 1 | 19 | 1 | 8 | 0 | 0 | 0 | 0 |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | 2125 | 1 | 1 | 1 | 2 | 1 | 5 | 2 | 4/14 | 2 | 18/28 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 9 | 9 | 4 | 9 | 11 | 43 | 25 | 234 | 12 | 286 | 10 | 201 | 1 | 8 | 0 | 0 | 15 | 17 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 10.3 | 4.6 | 12.6 | 28.7 | 13.8 | 11.5 | 1.1 | 0.0 | 17.2 | 87 |

NOBS = 9 $\overline{p / g}$ mean = 1.8377 $\overline{f / g}$ mean = 9.4423

$\overline{p} / \overline{g}$ mean = 1.8391 $\overline{f} / \overline{g}$ mean = 9.2759

GROUP COMPLEXITY INDEX (GCI) = 11.1149


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1998 NOVEMBER | 5.05 | 79.30 | 82.53 | 542.3 | 83.78 | 14.31 | 32.27 |
| DECEMBER | 5.41 | 84.82 | 88.63 | 582.7 | 90.79 | 15.43 | 34.43 |
| 1999 JANUARY | 5.72 | 90.54 | 96.27 | 654.6 | 97.92 | 16.56 | 37.27 |
| FEBRUARY | 5.81 | 92.95 | 100.30 | 712.1 | 100.93 | 17.06 | 38.83 |
| MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1998 NOVEMBER | 5.04 | 79.03 | 82.30 | 543.4 | 82.17 | 14.19 | 32.07 |
| DECEMBER | 5.12 | 80.69 | 85.50 | 572.4 | 84.84 | 14.56 | 33.05 |
| 1999 JANUARY | 5.25 | 83.40 | 89.68 | 611.5 | 88.97 | 15.14 | 34.48 |
| FEBRUARY | 5.44 | 86.74 | 94.22 | 655.6 | 93.98 | 15.87 | 36.11 |
| MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

## SUNSPOT RESULTS FOR MAY 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | |
| 03 | 2040 | 7 | 20 | 90 | 6 | 11 | 71 | 257 | 85 | 1.5 | 2.0 | 2.0 | 3757 |
| 04 | 2055 | 6 | 16 | 76 | 4 | 8 | 48 | 174 | 41 | 2.0 | 2.0 | 2.0 | 3758 |
| 05 | 2105 | 6 | 11 | 71 | 2 | 7 | 27 | 101 | 23 | 2.0 | 2.0 | 2.0 | 3759 |
| 06 | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | |
| 08 | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | 2045 | 12 | 106 | 226 | 24 | 21 | 261 | 2276 | 251 | 1.5 | 2.0 | 2.5 | 3760 |
| 16 | 2110 | 11 | 113 | 223 | 19 | 23 | 213 | 2537 | 220 | 1.5 | 2.5 | 2.5 | 3761 |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | 2050 | 10 | 128 | 228 | 18 | 34 | 214 | 3255 | 211 | 1.5 | 2.0 | 2.0 | 3762 |
| 20 | | | | | | | | | | | | | |
| 21 | 2050 | 9 | 101 | 191 | 24 | 30 | 270 | 2148 | 185 | 1.5 | 2.0 | 2.0 | 3763 |
| 22 | | | | | | | | | | | | | |
| 23 | 2100 | 10 | 60 | 160 | 16 | 19 | 179 | 1131 | 207 | 1.5 | 2.0 | 2.5 | 3764 |
| 24 | 2100 | 11 | 49 | 159 | 14 | 26 | 166 | 940 | 192 | 1.5 | 2.0 | 2.5 | 3765 |
| 25 | | | | | | | | | | | | | |
| 26 | 2125 | 9 | 54 | 144 | 13 | 28 | 158 | 1218 | 177 | 2.0 | 2.5 | 2.5 | 3766 |
| 27 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 91 | 658 | 1568 | 140 | 207 | 1607 | 14037 | 1592 | 16.5 | 21.0 | 22.5 | —— |
| NOBS | —— | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | —— |
| MNS | —— | 9.10 | 65.80 | 156.80 | 14.00 | 20.70 | 160.70 | 1403.70 | 159.20 | 1.65 | 2.10 | 2.25 | —— |

MEAN WEIGHT = 0.5026 MEAN CONDITION = 2.0000 QUALITY COUNT = 26.50

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# MAY 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | | | | | | | | | | | |
| 03 | 2040 | 25 | 5 | 8 | 10 | 1 | 1 | 1.5 | 2.0 | 2.0 | 3757 |
| 04 | 2055 | 19 | 3 | 6 | 7 | 2 | 1 | 2.0 | 2.0 | 2.0 | 3758 |
| 05 | 2105 | 12 | 1 | 3 | 3 | 1 | 4 | 2.0 | 2.0 | 2.0 | 3759 |
| 06 | | | | | | | | | | | |
| 07 | | | | | | | | | | | |
| 08 | | | | | | | | | | | |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | 2045 | 117 | 11 | 85 | 20 | 0 | 1 | 1.5 | 2.0 | 2.5 | 3760 |
| 16 | 2110 | 121 | 8 | 88 | 22 | 2 | 1 | 1.5 | 2.5 | 2.5 | 3761 |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | 2050 | 136 | 8 | 93 | 33 | 1 | 1 | 1.5 | 2.0 | 2.0 | 3762 |
| 20 | | | | | | | | | | | |
| 21 | 2050 | 107 | 6 | 70 | 28 | 1 | 2 | 1.5 | 2.0 | 2.0 | 3763 |
| 22 | | | | | | | | | | | |
| 23 | 2100 | 68 | 8 | 41 | 17 | 0 | 2 | 1.5 | 2.0 | 2.5 | 3764 |
| 24 | 2100 | 56 | 7 | 21 | 24 | 2 | 2 | 1.5 | 2.0 | 2.5 | 3765 |
| 25 | | | | | | | | | | | |
| 26 | 2125 | 62 | 8 | 26 | 27 | 0 | 1 | 2.0 | 2.5 | 2.5 | 3766 |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| Σ | —— | 723 | 65 | 441 | 191 | 10 | 16 | 16.5 | 21.0 | 22.5 | —— |
| NOBS | —— | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | —— |
| MNS | —— | 72.30 | 6.50 | 44.10 | 19.10 | 1.00 | 1.60 | 1.65 | 2.10 | 2.25 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# MAY 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | | | | | | | |
| 03 | 2040 | 1 | 1 | 0 | 0 | 4 | 2/3/5/6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 |
| 04 | 2055 | 1 | 1 | 1 | 2 | 2 | 5/6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 05 | 2105 | 4 | 1/1/1/1 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 06 | | | | | | | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | | | | | | | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | 2045 | 1 | 1 | 1 | 2 | 3 | 2/2/4 | 4 | 5/5/7/8 | 3 | 9/24/37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 2110 | 1 | 1 | 2 | 2/3 | 2 | 3/3 | 1 | 12 | 3 | 13/29/45 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | 2050 | 1 | 1 | 2 | 2/3 | 1 | 5 | 1 | 19 | 2 | 23/39 | 1 | 33 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | 2050 | 2 | 1/1 | 0 | 0 | 0 | 0 | 3 | 9/17/27 | 2 | 18/25 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | 2100 | 2 | 1/1 | 1 | 2 | 2 | 2/3 | 3 | 7/9/16 | 1 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 24 | 2100 | 2 | 1/1 | 0 | 0 | 3 | 4/4/6 | 1 | 12 | 1 | 15 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1/2/2 |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | 2125 | 1 | 1 | 2 | 2/3 | 1 | 3 | 4 | 3/4/7/11 | 0 | 0 | 1 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 16 | 16 | 9 | 21 | 19 | 74 | 17 | 178 | 12 | 294 | 2 | 53 | 0 | 0 | 2 | 3 | 14 | 19 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 17.6 | 9.9 | 20.9 | 18.7 | 13.2 | 2.2 | 0.0 | 2.2 | 15.4 | 91 |

NOBS = 10 $\overline{p / g}$ mean = 1.4368 $\overline{f / g}$ mean = 6.6940

$\overline{p} / \overline{g}$ mean = 1.5385 $\overline{f} / \overline{g}$ mean = 7.2308

GROUP COMPLEXITY INDEX (GCI) = 8.7692


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1998 DECEMBER | 5.41 | 84.82 | 88.63 | 582.7 | 90.79 | 15.43 | 34.43 |
| 1999 JANUARY | 5.72 | 90.54 | 96.27 | 654.6 | 97.92 | 16.56 | 37.27 |
| FEBRUARY | 5.81 | 92.95 | 100.30 | 712.1 | 100.93 | 17.06 | 38.83 |
| MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1998 DECEMBER | 5.12 | 80.69 | 85.50 | 572.4 | 84.84 | 14.56 | 33.05 |
| 1999 JANUARY | 5.25 | 83.40 | 89.68 | 611.5 | 88.97 | 15.14 | 34.48 |
| FEBRUARY | 5.44 | 86.74 | 94.22 | 655.6 | 93.98 | 15.87 | 36.11 |
| MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**


## SUNSPOT RESULTS FOR JUNE 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 2130 | 7 | 40 | 110 | 7 | 16 | 86 | 861 | 119 | 2.5 | 2.5 | 2.5 | 3767 |
| 02 | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | |
| 05 | 2210 | 8 | 44 | 124 | 14 | 15 | 155 | 1172 | 172 | 1.5 | 2.0 | 2.0 | 3768 |
| 06 | 2140 | 7 | 61 | 131 | 15 | 26 | 176 | 1869 | 176 | 1.0 | 2.0 | 2.0 | 3769 |
| 07 | 2105 | 10 | 68 | 168 | 13 | 28 | 158 | 1934 | 181 | 1.5 | 2.0 | 1.5 | 3770 |
| 08 | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | 2115 | 11 | 84 | 194 | 20 | 33 | 233 | 1981 | 220 | 3.0 | 3.5 | 3.5 | 3771 |
| 13 | | | | | | | | | | | | | |
| 14 | 2110 | 12 | 90 | 210 | 21 | 44 | 254 | 1926 | 219 | 2.0 | 2.0 | 2.5 | 3772 |
| 15 | 2155 | 13 | 91 | 221 | 18 | 39 | 219 | 2326 | 250 | 1.5 | 2.0 | 2.0 | 3773 |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | |
| 21 | 2045 | 9 | 56 | 146 | 14 | 24 | 164 | 1133 | 197 | 2.0 | 3.0 | 3.0 | 3774 |
| 22 | 2130 | 10 | 53 | 153 | 17 | 21 | 191 | 1410 | 204 | 2.0 | 2.5 | 2.5 | 3775 |
| 23 | 2150 | 9 | 52 | 142 | 18 | 23 | 203 | 1083 | 196 | 1.5 | 2.0 | 2.0 | 3776 |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 96 | 639 | 1599 | 157 | 269 | 1839 | 15695 | 1934 | 18.5 | 23.5 | 23.5 | —— |
| NOBS | —— | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | —— |
| MNS | —— | 9.60 | 63.90 | 159.90 | 15.70 | 26.90 | 183.90 | 1569.50 | 193.40 | 1.85 | 2.35 | 2.35 | —— |

MEAN WEIGHT = 0.4801 MEAN CONDITION = 2.1833 QUALITY COUNT = 31.40

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# JUNE 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 2130 | 44 | 4 | 24 | 13 | 0 | 3 | 2.5 | 2.5 | 2.5 | 3767 |
| 02 | | | | | | | | | | | |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | 2210 | 50 | 6 | 27 | 15 | 2 | 0 | 1.5 | 2.0 | 2.0 | 3768 |
| 06 | 2140 | 67 | 6 | 34 | 26 | 1 | 0 | 1.0 | 2.0 | 2.0 | 3769 |
| 07 | 2105 | 73 | 5 | 38 | 25 | 2 | 3 | 1.5 | 2.0 | 1.5 | 3770 |
| 08 | | | | | | | | | | | |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | 2115 | 93 | 9 | 50 | 32 | 1 | 1 | 3.0 | 3.5 | 3.5 | 3771 |
| 13 | | | | | | | | | | | |
| 14 | 2110 | 100 | 10 | 44 | 44 | 2 | 0 | 2.0 | 2.0 | 2.5 | 3772 |
| 15 | 2155 | 99 | 8 | 51 | 35 | 1 | 4 | 1.5 | 2.0 | 2.0 | 3773 |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | 2045 | 61 | 5 | 29 | 23 | 3 | 1 | 2.0 | 3.0 | 3.0 | 3774 |
| 22 | 2130 | 60 | 7 | 29 | 21 | 3 | 0 | 2.0 | 2.5 | 2.5 | 3775 |
| 23 | 2150 | 57 | 5 | 23 | 25 | 4 | 0 | 1.5 | 2.0 | 2.0 | 3776 |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| Σ | —— | 704 | 65 | 349 | 259 | 19 | 12 | 18.5 | 23.5 | 23.5 | —— |
| NOBS | —— | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | —— |
| MNS | —— | 70.40 | 6.50 | 34.90 | 25.90 | 1.90 | 1.20 | 1.85 | 2.35 | 2.35 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# JUNE 2000

**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 | 2130 | 3 | 1/1/1 | 1 | 2 | 1 | 2 | 0 | 0 | 2 | 11/22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02 | | | | | | | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | 2210 | 0 | 0 | 1 | 2 | 3 | 2/2/6 | 0 | 0 | 1 | 7 | 1 | 23 | 0 | 0 | 1 | 1 | 1 | 1 |
| 06 | 2140 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 6 | 1 | 10 | 2 | 8/30 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 07 | 2105 | 3 | 1/1/1 | 0 | 0 | 1 | 6 | 2 | 6/8 | 0 | 0 | 2 | 12/31 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 08 | | | | | | | | | | | | | | | | | | | |
| 09 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | 2115 | 1 | 1 | 0 | 0 | 2 | 2/4 | 5 | 4/9/10/11/13 | 0 | 0 | 1 | 27 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | 2110 | 0 | 0 | 1 | 3 | 4 | 2/3/5/12 | 2 | 6/8 | 2 | 11/21 | 1 | 17 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 15 | 2155 | 4 | 1/1/1/1 | 1 | 2 | 0 | 0 | 3 | 6/8/8 | 3 | 5/13/15 | 1 | 29 | 0 | 0 | 0 | 0 | 1 | 1 |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | 2045 | 1 | 1 | 1 | 4 | 1 | 3 | 2 | 8/14 | 1 | 23 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1/1 |
| 22 | 2130 | 0 | 0 | 1 | 2 | 1 | 2 | 3 | 4/4/5 | 1 | 14 | 1 | 19 | 0 | 0 | 1 | 1 | 2 | 1/1 |
| 23 | 2150 | 0 | 0 | 0 | 0 | 1 | 9 | 2 | 4/13 | 2 | 10/12 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1/1/1 |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 12 | 12 | 6 | 15 | 15 | 64 | 20 | 155 | 13 | 174 | 9 | 196 | 0 | 0 | 4 | 4 | 17 | 19 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 12.5 | 6.2 | 15.6 | 20.8 | 13.5 | 9.4 | 0.0 | 4.2 | 17.7 | 96 |

NOBS = 10 $\overline{p / g}$ mean = 1.6401 $\overline{f / g}$ mean = 6.6165

$\overline{p} / \overline{g}$ mean = 1.6354 $\overline{f} / \overline{g}$ mean = 6.6562

GROUP COMPLEXITY INDEX (GCI) = 8.2917


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1999 JANUARY | 5.72 | 90.54 | 96.27 | 654.6 | 97.92 | 16.56 | 37.27 |
| FEBRUARY | 5.81 | 92.95 | 100.30 | 712.1 | 100.93 | 17.06 | 38.83 |
| MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |
| DECEMBER | 7.81 | 133.42 | 148.92 | 1300.7 | 151.72 | 24.69 | 60.78 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1999 JANUARY | 5.25 | 83.40 | 89.68 | 611.5 | 88.97 | 15.14 | 34.48 |
| FEBRUARY | 5.44 | 86.74 | 94.22 | 655.6 | 93.98 | 15.87 | 36.11 |
| MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |
| DECEMBER | 7.51 | 128.40 | 144.02 | 1265.1 | 146.76 | 23.80 | 58.61 |


# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

## SUNSPOT RESULTS FOR JULY 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | |
| 06 | 2135 | 8 | 74 | 154 | 15 | 21 | 171 | 1493 | 124 | 2.0 | 2.5 | 2.5 | 3777 |
| 07 | | | | | | | | | | | | | |
| 08 | 2110 | 11 | 112 | 222 | 29 | 41 | 331 | 3256 | 230 | 2.0 | 2.5 | 2.5 | 3778 |
| 09 | 2100 | 13 | 136 | 266 | 25 | 54 | 304 | 3577 | 208 | 1.5 | 2.0 | 2.0 | 3779 |
| 10 | 2125 | 14 | 147 | 287 | 28 | 37 | 317 | 4815 | 273 | 1.5 | 1.5 | 2.0 | 3780 |
| 11 | 2150 | 12 | 121 | 241 | 26 | 36 | 296 | 3520 | 302 | 2.5 | 3.0 | 2.5 | 3781 |
| 12 | 2225 | 13 | 115 | 245 | 27 | 42 | 312 | 3420 | 280 | 1.5 | 2.5 | 2.5 | 3782 |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | 2125 | 14 | 152 | 292 | 39 | 54 | 444 | 4599 | 322 | 1.0 | 1.5 | 2.5 | 3783 |
| 21 | 2120 | 12 | 152 | 272 | 35 | 36 | 386 | 5095 | 295 | 1.5 | 2.0 | 2.5 | 3784 |
| 22 | 2115 | 16 | 151 | 311 | 30 | 65 | 365 | 4675 | 273 | 1.5 | 1.5 | 2.5 | 3785 |
| 23 | 2120 | 13 | 116 | 246 | 25 | 43 | 293 | 3445 | 228 | 1.5 | 2.0 | 2.5 | 3786 |
| 24 | | | | | | | | | | | | | |
| 25 | 2130 | 10 | 82 | 182 | 17 | 38 | 208 | 1991 | 146 | 2.0 | 2.5 | 2.5 | 3787 |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | 2040 | 9 | 24 | 114 | 11 | 10 | 120 | 578 | 102 | 2.0 | 2.0 | 2.5 | 3788 |
| 31 | 2055 | 8 | 29 | 109 | 12 | 12 | 132 | 636 | 122 | 1.0 | 1.0 | 2.0 | 3789 |
| Σ | —— | 153 | 1411 | 2941 | 319 | 489 | 3679 | 41100 | 2905 | 21.5 | 26.5 | 31.0 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 11.77 | 108.54 | 226.23 | 24.54 | 37.62 | 283.00 | 3161.54 | 223.46 | 1.65 | 2.04 | 2.38 | —— |

MEAN WEIGHT = 0.5096 MEAN CONDITION = 2.0256 QUALITY COUNT = 38.69

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# JULY 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | | | | | | | | | | | |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | | | | | | | | | | | |
| 06 | 2135 | 81 | 7 | 53 | 20 | 0 | 1 | 2.0 | 2.5 | 2.5 | 3777 |
| 07 | | | | | | | | | | | |
| 08 | 2110 | 119 | 7 | 68 | 40 | 3 | 1 | 2.0 | 2.5 | 2.5 | 3778 |
| 09 | 2100 | 143 | 7 | 79 | 51 | 3 | 3 | 1.5 | 2.0 | 2.0 | 3779 |
| 10 | 2125 | 154 | 7 | 105 | 35 | 5 | 2 | 1.5 | 1.5 | 2.0 | 3780 |
| 11 | 2150 | 130 | 9 | 82 | 36 | 3 | 0 | 2.5 | 3.0 | 2.5 | 3781 |
| 12 | 2225 | 124 | 9 | 71 | 40 | 2 | 2 | 1.5 | 2.5 | 2.5 | 3782 |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | 2125 | 161 | 9 | 93 | 54 | 5 | 0 | 1.0 | 1.5 | 2.5 | 3783 |
| 21 | 2120 | 160 | 8 | 112 | 36 | 4 | 0 | 1.5 | 2.0 | 2.5 | 3784 |
| 22 | 2115 | 162 | 11 | 83 | 63 | 3 | 2 | 1.5 | 1.5 | 2.5 | 3785 |
| 23 | 2120 | 124 | 8 | 71 | 40 | 2 | 3 | 1.5 | 2.0 | 2.5 | 3786 |
| 24 | | | | | | | | | | | |
| 25 | 2130 | 90 | 8 | 43 | 37 | 1 | 1 | 2.0 | 2.5 | 2.5 | 3787 |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | 2040 | 27 | 3 | 10 | 8 | 4 | 2 | 2.0 | 2.0 | 2.5 | 3788 |
| 31 | 2055 | 35 | 6 | 15 | 12 | 2 | 0 | 1.0 | 1.0 | 2.0 | 3789 |
| Σ | —— | 1510 | 99 | 885 | 472 | 37 | 17 | 21.5 | 26.5 | 31.0 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 116.15 | 7.62 | 68.08 | 36.31 | 2.85 | 1.31 | 1.65 | 2.04 | 2.38 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# JULY 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | 2135 | 1 | 1 | 0 | 0 | 3 | 2/2/4 | 2 | 7/25 | 1 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | 2110 | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 0 | 3 | 14/17/26 | 2 | 20/27 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 09 | 2100 | 3 | 1/1/1 | 2 | 2/5 | 0 | 0 | 1 | 30 | 2 | 18/24 | 2 | 24/27 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 10 | 2125 | 2 | 1/1 | 1 | 2 | 1 | 3 | 1 | 15 | 0 | 0 | 4 | 20/28/31/41 | 0 | 0 | 0 | 0 | 5 | 1/1/1/1/1 |
| 11 | 2150 | 0 | 0 | 0 | 0 | 3 | 2/3/3 | 2 | 4/10 | 2 | 15/18 | 2 | 21/42 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 12 | 2225 | 2 | 1/1 | 1 | 2 | 1 | 2 | 3 | 6/6/13 | 1 | 8 | 3 | 11/18/45 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 13 | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | 2125 | 0 | 0 | 0 | 0 | 1 | 4 | 3 | 6/10/12 | 2 | 7/17 | 2 | 33/56 | 0 | 0 | 0 | 0 | 6 | 1/1/1/1 1/2 |
| 21 | 2120 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 5 | 2 | 8/11 | 3 | 22/37/60 | 0 | 0 | 0 | 0 | 5 | 1/1/1/1/2 |
| 22 | 2115 | 2 | 1/1 | 1 | 2 | 5 | 2/3/3/3/4 | 2 | 3/9 | 0 | 0 | 3 | 22/44/51 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 23 | 2120 | 3 | 1/1/1 | 0 | 0 | 3 | 2/2/3 | 2 | 2/6 | 1 | 27 | 2 | 30/39 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | 2130 | 1 | 1 | 1 | 2 | 3 | 3/6/7 | 1 | 5 | 1 | 30 | 1 | 25 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | 2040 | 2 | 1/1 | 1 | 2 | 0 | 0 | 1 | 9 | 0 | 0 | 1 | 7 | 0 | 0 | 0 | 0 | 4 | 1/1/1/1 |
| 31 | 2055 | 0 | 0 | 2 | 2/2 | 1 | 3 | 2 | 4/7 | 0 | 0 | 1 | 9 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| TOTALS | —— | 17 | 17 | 10 | 23 | 23 | 71 | 21 | 194 | 15 | 271 | 26 | 790 | 0 | 0 | 0 | 0 | 41 | 45 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 11.1 | 6.5 | 15.0 | 13.7 | 9.8 | 17.0 | 0.0 | 0.0 | 26.8 | 153 |

NOBS = 13 $\overline{p / g}$ mean = 2.0462 $\overline{f / g}$ mean = 8.8999

$\overline{p} / \overline{g}$ mean = 2.0850 $\overline{f} / \overline{g}$ mean = 9.2222

GROUP COMPLEXITY INDEX (GCI) = 11.3072


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1999 FEBRUARY | 5.81 | 92.95 | 100.30 | 712.1 | 100.93 | 17.06 | 38.83 |
| MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |
| DECEMBER | 7.81 | 133.42 | 148.92 | 1300.7 | 151.72 | 24.69 | 60.78 |
| 2000 JANUARY | 7.96 | 137.71 | 155.60 | 1401.8 | 155.56 | 25.37 | 63.72 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1999 FEBRUARY | 5.44 | 86.74 | 94.22 | 655.6 | 93.98 | 15.87 | 36.11 |
| MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |
| DECEMBER | 7.51 | 128.40 | 144.02 | 1265.1 | 146.76 | 23.80 | 58.61 |
| 2000 JANUARY | 7.84 | 134.68 | 150.78 | 1334.7 | 153.59 | 24.94 | 61.82 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

## SUNSPOT RESULTS FOR AUGUST 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 2055 | 9 | 41 | 131 | 11 | 25 | 135 | 713 | 123 | 1.0 | 2.0 | 2.0 | 3790 |
| 02 | 2045 | 11 | 32 | 142 | 12 | 17 | 137 | 562 | 142 | 1.5 | 2.0 | 2.0 | 3791 |
| 03 | | | | | | | | | | | | | |
| 04 | 2135 | 10 | 35 | 135 | 13 | 15 | 145 | 641 | 160 | 1.5 | 2.5 | 2.5 | 3792 |
| 05 | | | | | | | | | | | | | |
| 06 | 2110 | 13 | 53 | 183 | 16 | 24 | 184 | 987 | 171 | 1.5 | 1.5 | 2.0 | 3793 |
| 07 | 2135 | 13 | 71 | 201 | 18 | 32 | 212 | 1335 | 184 | 1.5 | 1.5 | 2.0 | 3794 |
| 08 | 2100 | 9 | 51 | 141 | 17 | 21 | 191 | 1034 | 167 | 2.0 | 3.0 | 3.0 | 3795 |
| 09 | 2150 | 9 | 48 | 138 | 15 | 18 | 168 | 999 | 198 | 2.0 | 2.5 | 2.5 | 3796 |
| 10 | 2225 | 11 | 46 | 156 | 15 | 13 | 163 | 873 | 218 | 2.0 | 3.0 | 3.0 | 3797 |
| 11 | | | | | | | | | | | | | |
| 12 | 2220 | 15 | 55 | 205 | 17 | 29 | 199 | 811 | 171 | 2.0 | 2.5 | 3.0 | 3798 |
| 13 | 2145 | 16 | 64 | 224 | 14 | 34 | 174 | 752 | 142 | 2.0 | 2.5 | 2.5 | 3799 |
| 14 | 2055 | 15 | 69 | 219 | 20 | 28 | 228 | 1047 | 186 | 1.5 | 2.0 | 2.5 | 3800 |
| 15 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | 2115 | 10 | 71 | 171 | 15 | 45 | 195 | 1540 | 148 | 1.5 | 2.0 | 2.0 | 3801 |
| 18 | 2120 | 9 | 58 | 148 | 14 | 32 | 172 | 1122 | 186 | 2.0 | 2.0 | 2.5 | 3802 |
| 19 | 2040 | 10 | 30 | 130 | 11 | 17 | 127 | 356 | 155 | 1.5 | 2.0 | 2.5 | 3803 |
| 20 | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | |
| 22 | 2025 | 6 | 24 | 84 | 8 | 7 | 87 | 518 | 81 | 2.0 | 1.5 | 1.5 | 3804 |
| 23 | 2040 | 5 | 21 | 71 | 8 | 9 | 89 | 324 | 85 | 1.5 | 2.0 | 2.5 | 3805 |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |
| 28 | 2040 | 10 | 67 | 167 | 17 | 23 | 193 | 1343 | 154 | 1.5 | 2.0 | 2.0 | 3806 |
| 29 | | | | | | | | | | | | | |
| 30 | 2055 | 10 | 76 | 176 | 17 | 34 | 204 | 1535 | 144 | 1.5 | 2.5 | 3.0 | 3807 |
| 31 | 2110 | 12 | 48 | 168 | 16 | 18 | 178 | 1160 | 155 | 1.5 | 2.5 | 2.5 | 3808 |
| Σ | —— | 203 | 960 | 2990 | 274 | 441 | 3181 | 17652 | 2970 | 31.5 | 41.5 | 45.5 | —— |
| NOBS | —— | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | —— |
| MNS | —— | 10.68 | 50.53 | 157.37 | 14.42 | 23.21 | 167.42 | 929.05 | 156.32 | 1.66 | 2.18 | 2.39 | —— |

MEAN WEIGHT = 0.4925 MEAN CONDITION = 2.0789 QUALITY COUNT = 30.68

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# AUGUST 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 2055 | 48 | 7 | 15 | 24 | 1 | 1 | 1.0 | 2.0 | 2.0 | 3790 |
| 02 | 2045 | 40 | 8 | 13 | 16 | 2 | 1 | 1.5 | 2.0 | 2.0 | 3791 |
| 03 | | | | | | | | | | | |
| 04 | 2135 | 41 | 6 | 17 | 14 | 3 | 1 | 1.5 | 2.5 | 2.5 | 3792 |
| 05 | | | | | | | | | | | |
| 06 | 2110 | 60 | 7 | 25 | 22 | 4 | 2 | 1.5 | 1.5 | 2.0 | 3793 |
| 07 | 2135 | 79 | 8 | 37 | 29 | 2 | 3 | 1.5 | 1.5 | 2.0 | 3794 |
| 08 | 2100 | 57 | 6 | 28 | 20 | 2 | 1 | 2.0 | 3.0 | 3.0 | 3795 |
| 09 | 2150 | 55 | 7 | 29 | 17 | 1 | 1 | 2.0 | 2.5 | 2.5 | 3796 |
| 10 | 2225 | 53 | 7 | 31 | 11 | 2 | 2 | 2.0 | 3.0 | 3.0 | 3797 |
| 11 | | | | | | | | | | | |
| 12 | 2220 | 63 | 8 | 23 | 25 | 3 | 4 | 2.0 | 2.5 | 3.0 | 3798 |
| 13 | 2145 | 76 | 12 | 28 | 32 | 2 | 2 | 2.0 | 2.5 | 2.5 | 3799 |
| 14 | 2055 | 80 | 11 | 38 | 27 | 3 | 1 | 1.5 | 2.0 | 2.5 | 3800 |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | 2115 | 80 | 9 | 26 | 44 | 0 | 1 | 1.5 | 2.0 | 2.0 | 3801 |
| 18 | 2120 | 67 | 9 | 26 | 32 | 0 | 0 | 2.0 | 2.0 | 2.5 | 3802 |
| 19 | 2040 | 38 | 8 | 11 | 17 | 2 | 0 | 1.5 | 2.0 | 2.5 | 3803 |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | 2025 | 27 | 3 | 16 | 5 | 1 | 2 | 2.0 | 1.5 | 1.5 | 3804 |
| 23 | 2040 | 25 | 4 | 12 | 8 | 0 | 1 | 1.5 | 2.0 | 2.5 | 3805 |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | 2040 | 74 | 7 | 42 | 22 | 2 | 1 | 1.5 | 2.0 | 2.0 | 3806 |
| 29 | | | | | | | | | | | |
| 30 | 2055 | 82 | 6 | 41 | 31 | 1 | 3 | 1.5 | 2.5 | 3.0 | 3807 |
| 31 | 2110 | 55 | 7 | 27 | 16 | 3 | 2 | 1.5 | 2.5 | 2.5 | 3808 |
| Σ | —— | 1100 | 140 | 485 | 412 | 34 | 29 | 31.5 | 41.5 | 45.5 | —— |
| NOBS | —— | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | —— |
| MNS | —— | 57.89 | 7.37 | 25.53 | 21.68 | 1.79 | 1.53 | 1.66 | 2.18 | 2.39 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# AUGUST 2000

**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 | 2055 | 1 | 1 | 1 | 5 | 3 | 3/5/6 | 2 | 4/6 | 0 | 0 | 1 | 10 | 0 | 0 | 0 | 0 | 1 | 1 |
| 02 | 2045 | 1 | 1 | 2 | 2/2 | 3 | 2/2/5 | 2 | 4/6 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | 2135 | 1 | 1 | 0 | 0 | 2 | 2/5 | 3 | 3/7/12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1/1/1/2 |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | 2110 | 2 | 1/1 | 0 | 0 | 3 | 2/4/6 | 3 | 3/8/9 | 1 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1/1/1/1 |
| 07 | 2135 | 3 | 1/1/1 | 0 | 0 | 3 | 2/4/4 | 4 | 4/5/11/13 | 1 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 08 | 2100 | 1 | 1 | 0 | 0 | 1 | 2 | 4 | 5/5/6/14 | 1 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 09 | 2150 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 4/4/13 | 1 | 19 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 |
| 10 | 2225 | 2 | 1/1 | 0 | 0 | 2 | 2/5 | 4 | 2/3/4/12 | 1 | 14 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | 2220 | 4 | 1/1/1/1 | 0 | 0 | 5 | 2/3/4/4/5 | 3 | 3/12/15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 13 | 2145 | 2 | 1/1 | 4 | 2/2/3/3 | 7 | 2/3/3/4/4/5/6 | 1 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 14 | 2055 | 1 | 1 | 3 | 2/2/3 | 4 | 2/2/2/8 | 4 | 4/5/6/29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | 2115 | 1 | 1 | 2 | 3/3 | 3 | 3/4/7 | 2 | 2/9 | 1 | 18 | 1 | 21 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | 2120 | 0 | 0 | 1 | 2 | 4 | 2/2/3/4 | 3 | 6/10/17 | 0 | 0 | 1 | 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 2040 | 0 | 0 | 1 | 3 | 5 | 2/2/4/5/5 | 2 | 3/4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | 2025 | 2 | 1/1 | 0 | 0 | 0 | 0 | 2 | 5/11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/5 |
| 23 | 2040 | 1 | 1 | 0 | 0 | 2 | 2/2 | 2 | 7/9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | 2040 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 4/13/21 | 1 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/2 |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | 2055 | 3 | 1/1/1 | 0 | 0 | 2 | 3/6 | 2 | 9/14 | 2 | 19/21 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 31 | 2110 | 2 | 1/1 | 0 | 0 | 2 | 2/4 | 1 | 8 | 2 | 7/16 | 0 | 0 | 1 | 4 | 0 | 0 | 4 | 1/1/1/2 |
| TOTALS | —— | 29 | 29 | 16 | 41 | 53 | 187 | 50 | 414 | 11 | 187 | 4 | 49 | 1 | 4 | 2 | 2 | 37 | 45 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 14.3 | 7.9 | 26.1 | 24.6 | 5.4 | 2.0 | 0.5 | 1.0 | 18.2 | 203 |

NOBS = 19 $\overline{p / g}$ mean = 1.3848 $\overline{f / g}$ mean = 4.7893

$\overline{p} / \overline{g}$ mean = 1.3498 $\overline{f} / \overline{g}$ mean = 4.7291

GROUP COMPLEXITY INDEX (GCI) = 6.0788


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1999 MARCH | 5.75 | 91.97 | 99.82 | 714.8 | 99.56 | 16.91 | 38.44 |
| APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |
| DECEMBER | 7.81 | 133.42 | 148.92 | 1300.7 | 151.72 | 24.69 | 60.78 |
| 2000 JANUARY | 7.96 | 137.71 | 155.60 | 1401.8 | 155.56 | 25.37 | 63.72 |
| FEBRUARY | 8.30 | 143.82 | 163.09 | 1471.6 | 160.19 | 26.42 | 66.58 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1999 MARCH | 5.64 | 90.35 | 98.83 | 697.8 | 99.07 | 16.64 | 37.81 |
| APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |
| DECEMBER | 7.51 | 128.40 | 144.02 | 1265.1 | 146.76 | 23.80 | 58.61 |
| 2000 JANUARY | 7.84 | 134.68 | 150.78 | 1334.7 | 153.59 | 24.94 | 61.82 |
| FEBRUARY | 8.32 | 143.47 | 160.74 | 1430.8 | 162.77 | 26.51 | 66.17 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

## SUNSPOT RESULTS FOR SEPTEMBER 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | |
| 05 | 2055 | 7 | 60 | 130 | 17 | 23 | 193 | 1473 | 138 | 1.5 | 2.0 | 2.0 | 3809 |
| 06 | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | |
| 08 | | | | | | | | | | | | | |
| 09 | 2120 | 3 | 13 | 43 | 5 | 5 | 55 | 352 | 49 | 2.0 | 2.0 | 2.5 | 3810 |
| 10 | 2045 | 2 | 8 | 28 | 3 | 5 | 35 | 256 | 31 | 2.0 | 2.0 | 2.0 | 3811 |
| 11 | 2040 | 3 | 4 | 34 | 0 | 4 | 4 | 16 | 4 | 1.5 | 2.0 | 2.0 | 3812 |
| 12 | | | | | | | | | | | | | |
| 13 | 2045 | 5 | 11 | 61 | 5 | 4 | 54 | 150 | 60 | 2.0 | 3.0 | 3.0 | 3813 |
| 14 | 2035 | 7 | 27 | 97 | 10 | 8 | 108 | 405 | 96 | 2.0 | 2.0 | 2.0 | 3814 |
| 15 | 2105 | 6 | 49 | 109 | 15 | 16 | 166 | 906 | 109 | 2.0 | 2.5 | 2.5 | 3815 |
| 16 | | | | | | | | | | | | | |
| 17 | 2035 | 6 | 83 | 143 | 17 | 30 | 200 | 1841 | 168 | 1.0 | 1.5 | 2.0 | 3816 |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | 2200 | 4 | 106 | 146 | 16 | 29 | 189 | 3080 | 96 | 2.0 | 3.0 | 3.5 | 3817 |
| 21 | | | | | | | | | | | | | |
| 22 | 2055 | 5 | 141 | 191 | 21 | 32 | 242 | 3871 | 151 | 2.0 | 2.0 | 2.5 | 3818 |
| 23 | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | |
| 25 | 2035 | 7 | 111 | 181 | 18 | 37 | 217 | 3569 | 158 | 2.0 | 2.5 | 2.5 | 3819 |
| 26 | 2105 | 8 | 93 | 173 | 20 | 31 | 231 | 3142 | 193 | 2.0 | 2.5 | 2.5 | 3820 |
| 27 | | | | | | | | | | | | | |
| 28 | 2105 | 11 | 56 | 166 | 15 | 16 | 166 | 1430 | 196 | 2.0 | 2.0 | 2.5 | 3821 |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 74 | 762 | 1502 | 162 | 240 | 1860 | 20491 | 1449 | 24.0 | 29.0 | 31.5 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 5.69 | 58.62 | 115.54 | 12.46 | 18.46 | 143.08 | 1576.23 | 111.46 | 1.85 | 2.23 | 2.42 | —— |

MEAN WEIGHT = 0.4735 MEAN CONDITION = 2.1667 QUALITY COUNT = 18.77

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# SEPTEMBER 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | | | | | | | | | | | |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | 2055 | 63 | 3 | 33 | 23 | 3 | 1 | 1.5 | 2.0 | 2.0 | 3809 |
| 06 | | | | | | | | | | | |
| 07 | | | | | | | | | | | |
| 08 | | | | | | | | | | | |
| 09 | 2120 | 15 | 2 | 8 | 4 | 0 | 1 | 2.0 | 2.0 | 2.5 | 3810 |
| 10 | 2045 | 9 | 1 | 3 | 4 | 0 | 1 | 2.0 | 2.0 | 2.0 | 3811 |
| 11 | 2040 | 5 | 1 | 0 | 2 | 0 | 2 | 1.5 | 2.0 | 2.0 | 3812 |
| 12 | | | | | | | | | | | |
| 13 | 2045 | 14 | 3 | 7 | 2 | 0 | 2 | 2.0 | 3.0 | 3.0 | 3813 |
| 14 | 2035 | 33 | 6 | 18 | 8 | 1 | 0 | 2.0 | 2.0 | 2.0 | 3814 |
| 15 | 2105 | 54 | 5 | 32 | 16 | 1 | 0 | 2.0 | 2.5 | 2.5 | 3815 |
| 16 | | | | | | | | | | | |
| 17 | 2035 | 89 | 6 | 53 | 30 | 0 | 0 | 1.0 | 1.5 | 2.0 | 3816 |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | 2200 | 110 | 4 | 77 | 29 | 0 | 0 | 2.0 | 3.0 | 3.5 | 3817 |
| 21 | | | | | | | | | | | |
| 22 | 2055 | 145 | 4 | 108 | 32 | 1 | 0 | 2.0 | 2.0 | 2.5 | 3818 |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | 2035 | 117 | 6 | 73 | 37 | 1 | 0 | 2.0 | 2.5 | 2.5 | 3819 |
| 26 | 2105 | 100 | 7 | 62 | 30 | 0 | 1 | 2.0 | 2.5 | 2.5 | 3820 |
| 27 | | | | | | | | | | | |
| 28 | 2105 | 63 | 7 | 39 | 13 | 1 | 3 | 2.0 | 2.0 | 2.5 | 3821 |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| Σ | —— | 817 | 55 | 513 | 230 | 8 | 11 | 24.0 | 29.0 | 31.5 | —— |
| NOBS | —— | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | —— |
| MNS | —— | 62.85 | 4.23 | 39.46 | 17.69 | 0.62 | 0.85 | 1.85 | 2.23 | 2.42 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# SEPTEMBER 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | 2055 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 6 | 2 | 17/33 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 06 | | | | | | | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | | | | | | | | | | | | | | | | | | | |
| 09 | 2120 | 1 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 2045 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 2040 | 2 | 1/1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | 2045 | 2 | 1/1 | 0 | 0 | 1 | 2 | 2 | 3/4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 2035 | 0 | 0 | 0 | 0 | 5 | 2/2/2/2/2 | 1 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 15 | 2105 | 0 | 0 | 1 | 2 | 1 | 3 | 2 | 7/27 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | 2035 | 0 | 0 | 0 | 0 | 2 | 2/3 | 2 | 9/28 | 1 | 31 | 1 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | 2200 | 0 | 0 | 0 | 0 | 2 | 3/4 | 1 | 30 | 0 | 0 | 1 | 69 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | 2055 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 8/13/46 | 0 | 0 | 1 | 73 | 0 | 0 | 0 | 0 | 1 | 1 |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | 2035 | 0 | 0 | 0 | 0 | 3 | 3/3/3 | 0 | 0 | 1 | 16 | 2 | 22/63 | 0 | 0 | 0 | 0 | 1 | 1 |
| 26 | 2105 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 2/6 | 0 | 0 | 2 | 20/57 | 0 | 0 | 1 | 3 | 1 | 2 |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | 2105 | 3 | 1/1/1 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 9/16/18 | 0 | 0 | 1 | 3 | 0 | 0 | 3 | 1/2/2 |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 11 | 11 | 3 | 6 | 16 | 41 | 14 | 205 | 8 | 149 | 9 | 330 | 1 | 3 | 1 | 3 | 11 | 14 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 14.9 | 4.1 | 21.6 | 18.9 | 10.8 | 12.2 | 1.4 | 1.4 | 14.9 | 74 |

NOBS = 13 $\overline{p / g}$ mean = 2.1532 $\overline{f / g}$ mean = 10.2745

$\overline{p} / \overline{g}$ mean = 2.1892 $\overline{f} / \overline{g}$ mean = 10.2973

GROUP COMPLEXITY INDEX (GCI) = 12.4865


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1999 APRIL | 5.83 | 93.57 | 102.90 | 745.9 | 102.86 | 17.29 | 39.29 |
| MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |
| DECEMBER | 7.81 | 133.42 | 148.92 | 1300.7 | 151.72 | 24.69 | 60.78 |
| 2000 JANUARY | 7.96 | 137.71 | 155.60 | 1401.8 | 155.56 | 25.37 | 63.72 |
| FEBRUARY | 8.30 | 143.82 | 163.09 | 1471.6 | 160.19 | 26.42 | 66.58 |
| MARCH | 8.54 | 147.85 | 167.88 | 1509.9 | 163.94 | 27.14 | 68.45 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1999 APRIL | 5.92 | 95.15 | 104.77 | 751.8 | 105.69 | 17.64 | 40.06 |
| MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |
| DECEMBER | 7.51 | 128.40 | 144.02 | 1265.1 | 146.76 | 23.80 | 58.61 |
| 2000 JANUARY | 7.84 | 134.68 | 150.78 | 1334.7 | 153.59 | 24.94 | 61.82 |
| FEBRUARY | 8.32 | 143.47 | 160.74 | 1430.8 | 162.77 | 26.51 | 66.17 |
| MARCH | 8.74 | 151.55 | 170.20 | 1528.6 | 170.71 | 27.91 | 70.35 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

## SUNSPOT RESULTS FOR OCTOBER 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | 2115 | 12 | 76 | 196 | 19 | 32 | 222 | 1761 | 222 | 1.5 | 2.0 | 2.0 | 3822 |
| 03 | 1945 | 9 | 78 | 168 | 20 | 30 | 230 | 1671 | 245 | 3.0 | 3.0 | 3.0 | 3823 |
| 04 | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | |
| 06 | 2005 | 7 | 33 | 103 | 10 | 18 | 118 | 430 | 111 | 2.0 | 2.5 | 2.5 | 3824 |
| 07 | | | | | | | | | | | | | |
| 08 | | | | | | | | | | | | | |
| 09 | 2045 | 4 | 23 | 63 | 5 | 16 | 66 | 389 | 58 | 2.0 | 2.5 | 2.5 | 3825 |
| 10 | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 13 | 2000 | 7 | 44 | 114 | 16 | 17 | 177 | 874 | 197 | 1.5 | 2.0 | 2.0 | 3826 |
| 14 | | | | | | | | | | | | | |
| 15 | 2005 | 7 | 34 | 104 | 10 | 13 | 113 | 580 | 96 | 1.5 | 2.0 | 2.5 | 3827 |
| 16 | 2005 | 7 | 43 | 113 | 14 | 15 | 155 | 886 | 135 | 1.5 | 1.5 | 2.0 | 3828 |
| 17 | 2045 | 7 | 38 | 108 | 12 | 18 | 138 | 708 | 139 | 2.0 | 3.0 | 3.0 | 3829 |
| 18 | 2015 | 7 | 38 | 108 | 12 | 17 | 137 | 701 | 137 | 2.5 | 3.0 | 2.5 | 3830 |
| 19 | 2025 | 6 | 50 | 110 | 10 | 24 | 124 | 833 | 98 | 1.5 | 2.5 | 2.5 | 3831 |
| 20 | 2025 | 7 | 62 | 132 | 13 | 26 | 156 | 1012 | 113 | 1.5 | 3.0 | 2.5 | 3832 |
| 21 | 2015 | 8 | 60 | 140 | 9 | 30 | 120 | 1075 | 89 | 1.5 | 1.5 | 2.0 | 3833 |
| 22 | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | 1940 | 6 | 35 | 95 | 11 | 19 | 129 | 469 | 96 | 2.0 | 2.0 | 2.0 | 3834 |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | 1935 | 7 | 58 | 128 | 14 | 17 | 157 | 956 | 150 | 1.5 | 2.0 | 2.0 | 3835 |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 101 | 672 | 1682 | 175 | 292 | 2042 | 12345 | 1886 | 25.5 | 32.5 | 33.0 | —— |
| NOBS | —— | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | —— |
| MNS | —— | 7.21 | 48.00 | 120.14 | 12.50 | 20.86 | 145.86 | 881.79 | 134.71 | 1.82 | 2.32 | 2.36 | —— |

MEAN WEIGHT = 0.4762 MEAN CONDITION = 2.1667 QUALITY COUNT = 23.50

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# OCTOBER 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | 2115 | 83 | 7 | 42 | 29 | 2 | 3 | 1.5 | 2.0 | 2.0 | 3822 |
| 03 | 1945 | 85 | 7 | 47 | 29 | 1 | 1 | 3.0 | 3.0 | 3.0 | 3823 |
| 04 | | | | | | | | | | | |
| 05 | | | | | | | | | | | |
| 06 | 2005 | 39 | 6 | 15 | 17 | 0 | 1 | 2.0 | 2.5 | 2.5 | 3824 |
| 07 | | | | | | | | | | | |
| 08 | | | | | | | | | | | |
| 09 | 2045 | 27 | 4 | 7 | 16 | 0 | 0 | 2.0 | 2.5 | 2.5 | 3825 |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | 2000 | 51 | 7 | 27 | 17 | 0 | 0 | 1.5 | 2.0 | 2.0 | 3826 |
| 14 | | | | | | | | | | | |
| 15 | 2005 | 39 | 5 | 20 | 12 | 1 | 1 | 1.5 | 2.0 | 2.5 | 3827 |
| 16 | 2005 | 49 | 6 | 27 | 15 | 1 | 0 | 1.5 | 1.5 | 2.0 | 3828 |
| 17 | 2045 | 44 | 6 | 20 | 17 | 0 | 1 | 2.0 | 3.0 | 3.0 | 3829 |
| 18 | 2015 | 44 | 6 | 20 | 17 | 1 | 0 | 2.5 | 3.0 | 2.5 | 3830 |
| 19 | 2025 | 56 | 6 | 26 | 24 | 0 | 0 | 1.5 | 2.5 | 2.5 | 3831 |
| 20 | 2025 | 68 | 6 | 36 | 25 | 0 | 1 | 1.5 | 3.0 | 2.5 | 3832 |
| 21 | 2015 | 67 | 7 | 30 | 29 | 0 | 1 | 1.5 | 1.5 | 2.0 | 3833 |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | 1940 | 40 | 5 | 15 | 19 | 1 | 0 | 2.0 | 2.0 | 2.0 | 3834 |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | 1935 | 64 | 6 | 40 | 17 | 1 | 0 | 1.5 | 2.0 | 2.0 | 3835 |
| 31 | | | | | | | | | | | |
| Σ | —— | 756 | 84 | 372 | 283 | 8 | 9 | 25.5 | 32.5 | 33.0 | —— |
| NOBS | —— | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | —— |
| MNS | —— | 54.00 | 6.00 | 26.57 | 20.21 | 0.57 | 0.64 | 1.82 | 2.32 | 2.36 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# OCTOBER 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | 2115 | 3 | 1/1/1 | 0 | 0 | 2 | 2/4 | 3 | 5/7/16 | 1 | 19 | 1 | 18 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 03 | 1945 | 1 | 1 | 0 | 0 | 2 | 2/15 | 4 | 4/5/8/18 | 0 | 0 | 1 | 24 | 0 | 0 | 0 | 0 | 1 | 1 |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | 2005 | 1 | 1 | 0 | 0 | 3 | 3/5/7 | 3 | 5/5/7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | | | | | | | | | | | | | | | | | | | |
| 09 | 2045 | 0 | 0 | 1 | 4 | 2 | 3/3 | 0 | 0 | 1 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | 2000 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 4/5/8/8 | 2 | 7/9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | 2005 | 1 | 1 | 0 | 0 | 3 | 2/4/4 | 1 | 13 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 16 | 2005 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 5/7/17 | 1 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/3 |
| 17 | 2045 | 1 | 1 | 0 | 0 | 0 | 0 | 5 | 3/3/8/9/12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 18 | 2015 | 0 | 0 | 1 | 2 | 1 | 3 | 3 | 3/7/14 | 1 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 19 | 2025 | 0 | 0 | 1 | 3 | 3 | 3/4/6 | 1 | 19 | 1 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 2025 | 1 | 1 | 2 | 2/3 | 1 | 2 | 3 | 12/13/29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 2015 | 1 | 1 | 3 | 2/2/3 | 2 | 3/8 | 1 | 10 | 1 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | 1940 | 0 | 0 | 0 | 0 | 3 | 4/4/10 | 2 | 5/11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | 1935 | 0 | 0 | 0 | 0 | 2 | 8/9 | 3 | 7/7/17 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 9 | 9 | 8 | 21 | 26 | 123 | 36 | 336 | 10 | 128 | 2 | 42 | 0 | 0 | 0 | 0 | 10 | 13 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 8.9 | 7.9 | 25.7 | 35.6 | 9.9 | 2.0 | 0.0 | 0.0 | 9.9 | 101 |

NOBS = 14 $\overline{p / g}$ mean = 1.7221 $\overline{f / g}$ mean = 6.6012

$\overline{p} / \overline{g}$ mean = 1.7327 $\overline{f} / \overline{g}$ mean = 6.6535

GROUP COMPLEXITY INDEX (GCI) = 8.3861


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1999 MAY | 6.05 | 99.17 | 111.45 | 850.1 | 110.56 | 18.32 | 42.86 |
| JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |
| DECEMBER | 7.81 | 133.42 | 148.92 | 1300.7 | 151.72 | 24.69 | 60.78 |
| 2000 JANUARY | 7.96 | 137.71 | 155.60 | 1401.8 | 155.56 | 25.37 | 63.72 |
| FEBRUARY | 8.30 | 143.82 | 163.09 | 1471.6 | 160.19 | 26.42 | 66.58 |
| MARCH | 8.54 | 147.85 | 167.88 | 1509.9 | 163.94 | 27.14 | 68.45 |
| APRIL | 8.57 | 149.39 | 170.40 | 1536.9 | 164.86 | 27.34 | 69.76 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1999 MAY | 6.25 | 101.36 | 112.43 | 831.3 | 113.73 | 18.86 | 43.17 |
| JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |
| DECEMBER | 7.51 | 128.40 | 144.02 | 1265.1 | 146.76 | 23.80 | 58.61 |
| 2000 JANUARY | 7.84 | 134.68 | 150.78 | 1334.7 | 153.59 | 24.94 | 61.82 |
| FEBRUARY | 8.32 | 143.47 | 160.74 | 1430.8 | 162.77 | 26.51 | 66.17 |
| MARCH | 8.74 | 151.55 | 170.20 | 1528.6 | 170.71 | 27.91 | 70.35 |
| APRIL | 8.98 | 156.55 | 176.40 | 1596.0 | 174.14 | 28.70 | 73.08 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**

## SUNSPOT RESULTS FOR NOVEMBER 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | |
| 06 | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | |
| 08 | 1945 | 9 | 43 | 133 | 12 | 21 | 141 | 773 | 157 | 2.0 | 2.5 | 2.5 | 3836 |
| 09 | 1940 | 8 | 34 | 114 | 10 | 12 | 112 | 543 | 93 | 2.5 | 2.5 | 2.5 | 3837 |
| 10 | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | 1910 | 5 | 25 | 75 | 9 | 8 | 98 | 558 | 95 | 2.0 | 3.0 | 3.5 | 3838 |
| 13 | 2030 | 7 | 33 | 103 | 10 | 11 | 111 | 497 | 119 | 2.0 | 2.0 | 2.0 | 3839 |
| 14 | | | | | | | | | | | | | |
| 15 | 2000 | 8 | 42 | 122 | 10 | 17 | 117 | 875 | 124 | 2.0 | 2.0 | 2.5 | 3840 |
| 16 | | | | | | | | | | | | | |
| 17 | 2145 | 8 | 72 | 152 | 16 | 24 | 184 | 1843 | 109 | 2.0 | 2.0 | 2.5 | 3841 |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | |
| 23 | 1930 | 7 | 52 | 122 | 14 | 16 | 156 | 1418 | 222 | 2.0 | 2.5 | 3.0 | 3842 |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | 0155 | 4 | 23 | 63 | 5 | 8 | 58 | 360 | 103 | 2.0 | 3.0 | 2.5 | 3843 |
| 27 | | | | | | | | | | | | | |
| 28 | 1950 | 8 | 79 | 159 | 17 | 45 | 215 | 1291 | 240 | 1.5 | 2.0 | 2.0 | 3844 |
| 29 | 2005 | 9 | 62 | 152 | 16 | 29 | 189 | 1086 | 211 | 2.0 | 2.5 | 2.5 | 3845 |
| 30 | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | |
| Σ | —— | 73 | 465 | 1195 | 119 | 191 | 1381 | 9244 | 1473 | 20.0 | 24.0 | 25.5 | —— |
| NOBS | —— | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | —— |
| MNS | —— | 7.30 | 46.50 | 119.50 | 11.90 | 19.10 | 138.10 | 924.40 | 147.30 | 2.00 | 2.40 | 2.55 | —— |

MEAN WEIGHT = 0.4379 MEAN CONDITION = 2.3167 QUALITY COUNT = 23.10

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# NOVEMBER 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | | | | | | | | | | | |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | | | | | | | | | | | |
| 06 | | | | | | | | | | | |
| 07 | | | | | | | | | | | |
| 08 | 1945 | 49 | 6 | 20 | 20 | 2 | 1 | 2.0 | 2.5 | 2.5 | 3836 |
| 09 | 1940 | 38 | 4 | 19 | 11 | 3 | 1 | 2.5 | 2.5 | 2.5 | 3837 |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | 1910 | 29 | 4 | 16 | 8 | 1 | 0 | 2.0 | 3.0 | 3.5 | 3838 |
| 13 | 2030 | 39 | 6 | 22 | 10 | 0 | 1 | 2.0 | 2.0 | 2.0 | 3839 |
| 14 | | | | | | | | | | | |
| 15 | 2000 | 47 | 5 | 24 | 15 | 1 | 2 | 2.0 | 2.0 | 2.5 | 3840 |
| 16 | | | | | | | | | | | |
| 17 | 2145 | 79 | 7 | 47 | 24 | 1 | 0 | 2.0 | 2.0 | 2.5 | 3841 |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | 1930 | 58 | 6 | 35 | 16 | 1 | 0 | 2.0 | 2.5 | 3.0 | 3842 |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | 0155 | 26 | 3 | 14 | 8 | 1 | 0 | 2.0 | 3.0 | 2.5 | 3843 |
| 27 | | | | | | | | | | | |
| 28 | 1950 | 86 | 7 | 33 | 45 | 1 | 0 | 1.5 | 2.0 | 2.0 | 3844 |
| 29 | 2005 | 69 | 7 | 32 | 28 | 1 | 1 | 2.0 | 2.5 | 2.5 | 3845 |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| Σ | —— | 520 | 55 | 262 | 185 | 12 | 6 | 20.0 | 24.0 | 25.5 | —— |
| NOBS | —— | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | —— |
| MNS | —— | 52.0 | 5.50 | 26.20 | 18.50 | 1.20 | 0.60 | 2.00 | 2.40 | 2.55 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# NOVEMBER 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | | | | | | | | | | | | | | | | | | | |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | | | | | | | | | | | | | | | | | | | |
| 07 | | | | | | | | | | | | | | | | | | | |
| 08 | 1945 | 1 | 1 | 0 | 0 | 2 | 3/4 | 3 | 7/11/13 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1/2 |
| 09 | 1940 | 1 | 1 | 1 | 3 | 1 | 7 | 2 | 8/12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | |
| 12 | 1910 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 5 | 1 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 13 | 2030 | 1 | 1 | 0 | 0 | 3 | 5/5/6 | 2 | 2/3 | 1 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | 2000 | 2 | 1/1 | 1 | 2 | 1 | 4 | 1 | 5 | 2 | 10/18 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | 2145 | 0 | 0 | 1 | 2 | 3 | 3/4/6 | 1 | 18 | 0 | 0 | 1 | 36 | 0 | 0 | 0 | 0 | 2 | 1/2 |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | 1930 | 0 | 0 | 0 | 0 | 2 | 2/4 | 2 | 3/6 | 1 | 12 | 1 | 24 | 0 | 0 | 1 | 1 | 0 | 0 |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | 0155 | 0 | 0 | 0 | 0 | 2 | 3/5 | 1 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | 1950 | 0 | 0 | 0 | 0 | 2 | 4/11 | 5 | 8/9/12/14/20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 29 | 2005 | 1 | 1 | 0 | 0 | 3 | 4/5/5 | 3 | 8/8/15 | 1 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| TOTALS | —— | 6 | 6 | 3 | 7 | 20 | 94 | 21 | 201 | 6 | 79 | 2 | 60 | 0 | 0 | 3 | 3 | 12 | 15 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 8.2 | 4.1 | 27.4 | 28.8 | 8.2 | 2.7 | 0.0 | 4.1 | 16.4 | 73 |

NOBS = 10 $\overline{p / g}$ mean = 1.6215 $\overline{f / g}$ mean = 6.2935

$\overline{p} / \overline{g}$ mean = 1.6301 $\overline{f} / \overline{g}$ mean = 6.3699

GROUP COMPLEXITY INDEX (GCI) = 8.0000


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1999 JUNE | 6.16 | 102.56 | 116.00 | 929.1 | 115.30 | 18.92 | 45.19 |
| JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |
| DECEMBER | 7.81 | 133.42 | 148.92 | 1300.7 | 151.72 | 24.69 | 60.78 |
| 2000 JANUARY | 7.96 | 137.71 | 155.60 | 1401.8 | 155.56 | 25.37 | 63.72 |
| FEBRUARY | 8.30 | 143.82 | 163.09 | 1471.6 | 160.19 | 26.42 | 66.58 |
| MARCH | 8.54 | 147.85 | 167.88 | 1509.9 | 163.94 | 27.14 | 68.45 |
| APRIL | 8.57 | 149.39 | 170.40 | 1536.9 | 164.86 | 27.34 | 69.76 |
| MAY | 8.56 | 147.98 | 168.20 | 1480.2 | 163.14 | 27.22 | 68.48 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1999 JUNE | 6.51 | 106.63 | 118.93 | 913.9 | 120.40 | 19.85 | 45.98 |
| JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |
| DECEMBER | 7.51 | 128.40 | 144.02 | 1265.1 | 146.76 | 23.80 | 58.61 |
| 2000 JANUARY | 7.84 | 134.68 | 150.78 | 1334.7 | 153.59 | 24.94 | 61.82 |
| FEBRUARY | 8.32 | 143.47 | 160.74 | 1430.8 | 162.77 | 26.51 | 66.17 |
| MARCH | 8.74 | 151.55 | 170.20 | 1528.6 | 170.71 | 27.91 | 70.35 |
| APRIL | 8.98 | 156.55 | 176.40 | 1596.0 | 174.14 | 28.70 | 73.08 |
| MAY | 9.10 | 158.32 | 179.10 | 1610.4 | 174.12 | 28.98 | 73.78 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

**NEW ZEALAND**

**E-MAIL: gdso@earthling.net**
**WEBSITE: www.cv-helios.net/gdso**


## SUNSPOT RESULTS FOR DECEMBER 2000

**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 .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**WN = Wolf Number ; SN = Pettisindex ; BX = Beckindex ; CV = Classification Value .**

| DATE | UT | g | f | WN | p | s | SN | BX | CV | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | | | |
| 02 | 2115 | 7 | 45 | 115 | 13 | 16 | 146 | 993 | 164 | 2.0 | 2.5 | 2.5 | 3846 |
| 03 | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | |
| 06 | 1955 | 5 | 23 | 73 | 4 | 9 | 49 | 358 | 48 | 1.5 | 2.5 | 2.5 | 3847 |
| 07 | 1950 | 6 | 33 | 93 | 7 | 17 | 87 | 438 | 84 | 1.5 | 2.5 | 2.5 | 3848 |
| 08 | 2025 | 4 | 20 | 60 | 5 | 13 | 63 | 292 | 55 | 2.0 | 2.5 | 2.5 | 3849 |
| 09 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | |
| 11 | 1950 | 6 | 37 | 97 | 13 | 16 | 146 | 736 | 117 | 2.0 | 2.5 | 3.0 | 3850 |
| 12 | 2000 | 5 | 46 | 96 | 11 | 16 | 126 | 817 | 106 | 1.5 | 2.5 | 2.5 | 3851 |
| 13 | 2015 | 10 | 67 | 167 | 16 | 29 | 189 | 1311 | 171 | 1.5 | 2.0 | 2.0 | 3852 |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | |
| 20 | 2040 | 10 | 48 | 148 | 16 | 17 | 177 | 1169 | 242 | 1.5 | 2.0 | 2.5 | 3853 |
| 21 | 2045 | 11 | 56 | 166 | 15 | 25 | 175 | 1048 | 166 | 2.0 | 3.0 | 3.0 | 3854 |
| 22 | 2035 | 10 | 45 | 145 | 12 | 17 | 137 | 908 | 145 | 2.0 | 2.0 | 2.5 | 3855 |
| 23 | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | |
| 31 | 2030 | 4 | 47 | 87 | 10 | 15 | 115 | 1017 | 112 | 1.5 | 2.0 | 2.0 | 3856 |
| Σ | —— | 78 | 467 | 1247 | 122 | 190 | 1410 | 9087 | 1410 | 19.0 | 26.0 | 27.5 | —— |
| NOBS | —— | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | —— |
| MNS | —— | 7.09 | 42.45 | 113.36 | 11.09 | 17.27 | 128.18 | 826.09 | 128.18 | 1.73 | 2.36 | 2.50 | —— |

MEAN WEIGHT = 0.4608 MEAN CONDITION = 2.1970 QUALITY COUNT = 21.73

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT DISTRIBUTION & INTER-SOL INDICES FOR

# DECEMBER 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f . l . 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**
**IS = Inter-Sol Index .**
**gr = number of multi-spot groups .**
**grfp = number of umbræ within penumbræ 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 .**

| DATE | UT | IS | gr | grfp | grf | efp | ef | Q | S | T | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | | | | | | | | | | | |
| 02 | 2115 | 49 | 4 | 26 | 16 | 3 | 0 | 2.0 | 2.5 | 2.5 | 3846 |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | | | | | | | | | | | |
| 06 | 1955 | 26 | 3 | 14 | 7 | 0 | 2 | 1.5 | 2.5 | 2.5 | 3847 |
| 07 | 1950 | 38 | 5 | 16 | 16 | 0 | 1 | 1.5 | 2.5 | 2.5 | 3848 |
| 08 | 2025 | 24 | 4 | 7 | 13 | 0 | 0 | 2.0 | 2.5 | 2.5 | 3849 |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | 1950 | 42 | 5 | 20 | 16 | 1 | 0 | 2.0 | 2.5 | 3.0 | 3850 |
| 12 | 2000 | 50 | 4 | 29 | 16 | 1 | 0 | 1.5 | 2.5 | 2.5 | 3851 |
| 13 | 2015 | 73 | 6 | 35 | 28 | 3 | 1 | 1.5 | 2.0 | 2.0 | 3852 |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | 2040 | 56 | 8 | 29 | 17 | 2 | 0 | 1.5 | 2.0 | 2.5 | 3853 |
| 21 | 2045 | 64 | 8 | 29 | 24 | 2 | 1 | 2.0 | 3.0 | 3.0 | 3854 |
| 22 | 2035 | 51 | 6 | 25 | 16 | 3 | 1 | 2.0 | 2.0 | 2.5 | 3855 |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | 2030 | 51 | 4 | 32 | 15 | 0 | 0 | 1.5 | 2.0 | 2.0 | 3856 |
| Σ | —— | 524 | 57 | 262 | 184 | 15 | 6 | 19.0 | 26.0 | 27.5 | —— |
| NOBS | —— | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | —— |
| MNS | —— | 47.64 | 5.18 | 23.82 | 16.73 | 1.36 | 0.55 | 1.73 | 2.36 | 2.50 | —— |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## SUNSPOT CENSUS BY CLASSIFICATION FOR

# DECEMBER 2000

**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 | | | | | | | | | | | | | | | | | | | |
| 02 | 2115 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4/7/14 | 1 | 17 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1/1 |
| 03 | | | | | | | | | | | | | | | | | | | |
| 04 | | | | | | | | | | | | | | | | | | | |
| 05 | | | | | | | | | | | | | | | | | | | |
| 06 | 1955 | 2 | 1/1 | 1 | 2 | 0 | 0 | 2 | 9/10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07 | 1950 | 1 | 1 | 2 | 3/5 | 1 | 3 | 2 | 5/16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08 | 2025 | 0 | 0 | 1 | 2 | 2 | 2/2 | 1 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09 | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 11 | 1950 | 0 | 0 | 0 | 0 | 1 | 4 | 3 | 3/6/10 | 1 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 12 | 2000 | 0 | 0 | 0 | 0 | 1 | 3 | 3 | 4/11/27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 13 | 2015 | 1 | 1 | 1 | 5 | 2 | 2/3 | 2 | 11/16 | 1 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 14 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | |
| 20 | 2040 | 0 | 0 | 1 | 2 | 4 | 2/2/3/3 | 0 | 0 | 2 | 5/16 | 1 | 13 | 0 | 0 | 2 | 1/1 | 0 | 0 |
| 21 | 2045 | 1 | 1 | 3 | 2/3/3 | 2 | 2/2 | 2 | 4/13 | 1 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1/1 |
| 22 | 2035 | 1 | 1 | 2 | 2/2 | 2 | 2/3 | 1 | 9 | 1 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1/1/1 |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | 2030 | 0 | 0 | 0 | 0 | 1 | 6 | 2 | 4/4 | 1 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTALS | —— | 6 | 6 | 11 | 31 | 16 | 44 | 21 | 201 | 8 | 157 | 1 | 13 | 0 | 0 | 3 | 3 | 12 | 12 |

REGIONAL PERCENTAGES

| A | B | C | D | E | F | G | H | J | Σg |
|---|---|---|---|---|---|---|---|---|---|
| 7.7 | 14.1 | 20.5 | 26.9 | 10.3 | 1.3 | 0.0 | 3.8 | 15.4 | 78 |

NOBS = 11 $\overline{p / g}$ mean = 1.6095 $\overline{f / g}$ mean = 6.3396

$\overline{p} / \overline{g}$ mean = 1.5641 $\overline{f} / \overline{g}$ mean = 5.9872

GROUP COMPLEXITY INDEX (GCI) = 7.5513


## 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($S^W$) |
|---|---|---|---|---|---|---|---|
| 1999 JULY | 6.34 | 104.95 | 117.44 | 948.3 | 118.58 | 19.44 | 45.91 |
| AUGUST | 6.64 | 109.48 | 121.94 | 975.9 | 123.68 | 20.42 | 47.65 |
| SEPTEMBER | 6.99 | 115.90 | 129.49 | 1041.7 | 132.31 | 21.70 | 50.86 |
| OCTOBER | 7.42 | 124.67 | 139.44 | 1154.3 | 143.68 | 23.32 | 55.65 |
| NOVEMBER | 7.72 | 131.11 | 146.09 | 1251.5 | 149.83 | 24.33 | 59.32 |
| DECEMBER | 7.81 | 133.42 | 148.92 | 1300.7 | 151.72 | 24.69 | 60.78 |
| 2000 JANUARY | 7.96 | 137.71 | 155.60 | 1401.8 | 155.56 | 25.37 | 63.72 |
| FEBRUARY | 8.30 | 143.82 | 163.09 | 1471.6 | 160.19 | 26.42 | 66.58 |
| MARCH | 8.54 | 147.85 | 167.88 | 1509.9 | 163.94 | 27.14 | 68.45 |
| APRIL | 8.57 | 149.39 | 170.40 | 1536.9 | 164.86 | 27.34 | 69.76 |
| MAY | 8.56 | 147.98 | 168.20 | 1480.2 | 163.14 | 27.22 | 68.48 |
| JUNE | 8.61 | 147.41 | 167.16 | 1426.8 | 162.43 | 27.23 | 67.47 |

## 'BARNES 13' METHOD

| MONTH | g($S^{B13}$) | WN($S^{B13}$) | SN($S^{B13}$) | BX($S^{B13}$) | CV($S^{B13}$) | QC($S^{B13}$) | IS($S^{B13}$) |
|---|---|---|---|---|---|---|---|
| 1999 JULY | 6.67 | 109.97 | 123.08 | 977.6 | 124.52 | 20.48 | 47.86 |
| AUGUST | 6.76 | 112.23 | 126.03 | 1024.5 | 126.96 | 20.90 | 49.25 |
| SEPTEMBER | 6.89 | 115.04 | 129.59 | 1073.2 | 130.63 | 21.43 | 50.90 |
| OCTOBER | 7.10 | 119.71 | 135.18 | 1147.0 | 136.87 | 22.28 | 53.66 |
| NOVEMBER | 7.30 | 124.39 | 140.23 | 1219.1 | 142.31 | 23.08 | 56.46 |
| DECEMBER | 7.51 | 128.40 | 144.02 | 1265.1 | 146.76 | 23.80 | 58.61 |
| 2000 JANUARY | 7.84 | 134.68 | 150.78 | 1334.7 | 153.59 | 24.94 | 61.82 |
| FEBRUARY | 8.32 | 143.47 | 160.74 | 1430.8 | 162.77 | 26.51 | 66.17 |
| MARCH | 8.74 | 151.55 | 170.20 | 1528.6 | 170.71 | 27.91 | 70.35 |
| APRIL | 8.98 | 156.55 | 176.40 | 1596.0 | 174.14 | 28.70 | 73.08 |
| MAY | 9.10 | 158.32 | 179.10 | 1610.4 | 174.12 | 28.98 | 73.78 |
| JUNE | 9.13 | 158.60 | 180.80 | 1607.8 | 172.97 | 29.04 | 73.73 |

# GEORGI DOBROVOLSKI SOLAR OBSERVATORY

## OBSERVED ANNUAL MEANS OF SUNSPOT DATA FOR

# 2000

**All observations carried out by HOWARD BARNES .**
**Telescope : 76 mm refractor ( f.l. 910 mm ) .**
**Observed by PROJECTION . Full disc diameter = 145 mm approx .**
**Q = Quietness [ ie. steadiness ] refer to Kiepenheuer scale .**
**S = Sharpness [ ie. clarity ] refer to Kiepenheuer scale .**
**T = Transparency where 1 = excellent , 5 = worthless .**

| | | |
|---|---|---|
| g | = | 8.77 |
| f | = | 60.98 |
| Wolf Number | = | 148.73 |
| Truncated Wolf Number | = | 128.69 |
| p | = | 14.50 |
| s | = | 23.89 |
| Pettisindex | = | 168.92 |
| Beckindex | = | 1391.06 |
| Classification Value | = | 162.83 |
| Quality Count | = | 27.60 |
| Inter-Sol Index | = | 67.26 |
| Mean Weight | = | 0.4794 |
| Q | = | 1.78 |
| S | = | 2.25 |
| T | = | 2.40 |
| Mean Condition | = | 2.1413 |
| Total Number of Observations | = | 151 |