



Sunspot Index Data Center

SUNSPOT BULLETIN

Data Analysis Service supported by the FAGS

1989 , N° 3

Provisional Sunspot-Numbers for MARCH 1989

Dependent on observations at LOCARNO Specola Solare complemented by an international network and determined at the Observatoire Royal de Belgique.

Thirty eight coop. stations on APRIL 1989,1st,0930UT

| Day | R' i | Day | R' i |
|-----|---------|-----|---------|
| 1 | 127 | 16 | 187 |
| 2 | 107 | 17 | 177 |
| 3 | 103 | 18 | 164 |
| 4 | 98 | 19 | 148 |
| 5 | 90 | 20 | 158 |
| 6 | 103 | 21 | 155 |
| 7 | 98 | 22 | 155 |
| 8 | 109 | 23 | 145 |
| 9 | 133 | 24 | 150 |
| 10 | 163 | 25 | 131 |
| 11 | 155 | 26 | 117 |
| 12 | 140 | 27 | 102 |
| 13 | 154 | 28 | 89 |
| 14 | 181 | 29 | 95 |
| 15 | 165 | 30 | 70 |
| | | 31 | 91 |

Mean = 131 . 0

Predictions of the smoothed monthly Sunspot Numbers

| Classical Method | | S.I.D.C Adjusted values | |
|-------------------|-------------------|-------------------------|--|
| 1989 APR.166(+41) | 1989 OCT.184(+61) | 1989 APR .170(+42) | |
| MAY 171 | NOV.182 | MAY 177 | |
| JUN.177 | DEC.179 | JUN.185 | |
| JUL.182 | 1990 JAN.176 | JUL.191 | |
| AUG.184 | FEB.172 | AUG.193 | |
| SEP.184(+43) | MAR.167(+48) | SEP.193(+48) | |

Forecasted values on the basis of the latest provisional monthly smoothed Sunspot Number:1988 SEPTEMBER=121.2 ± 5% Provisional smoothed values:

| | | |
|--------------|--------------|--------------|
| 1988 OCT.127 | 1988 DEC.141 | 1989 FEB.154 |
| NOV.133 | 1989 JAN 148 | MAR.159 |

Erratum S-B 2,SIDC adjus SN ,read 159/166/173/182/188/190

Brussels, 1989 APRIL ,1st

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| S.I.D.C. SUMMARY OF THE URSIGRAMS | | | | | | | | | |
|-----------------------------------|-----|------|------|------|-----|-----|-----|-----|----------------------------|
| 1989 MARCH R' = 131.0 | | | | | | | | | |
| im | | | | | | | | | |
| Date | R' | PPSI | 600 | 2800 | COS | XFI | XI | Ak | SEA |
| 28 | 128 | 85 | | 167 | 897 | 26 | 1/0 | 14 | |
| 1 | 127 | 59 | 74 | 170 | 900 | 20 | 2/0 | 12 | |
| 2 | 107 | 75 | 74 | 177 | 896 | 36 | 4/0 | 21 | ssc(0246) |
| 3 | 103 | 95 | 78 | 173 | 895 | 9 | 1/0 | 32 | |
| 4 | 98 | 59 | 78 | 166 | 891 | 2 | 0/0 | 12 | |
| 5 | 90 | 60 | 83 | 185 | 902 | 4 | 2/0 | 27 | |
| 6 | 103 | 44 | >96 | 212 | 906 | 127 | 2/1 | 24 | 1353;3b,X(1313),II+IV,ten! |
| 7 | 98 | 69 | 90 | 210 | 905 | 151 | 5/1 | 16 | 1310+2b(1449),sid |
| 8 | 109 | 116 | 90 | 206 | 907 | 45 | 3/0 | 21 | p(1730),ssc(1754) |
| 9 | 133 | 116 | >99 | 230 | 904 | 170 | 6/1 | 24 | 1303+P,4b(1523),sid,p(2040 |
| 10 | 163 | 182 | 100 | 216 | 882 | 169 | 4/1 | 20 | 3b(1858),ten,p(2420) |
| 11 | 155 | 283 | >98 | 246 | 893 | 347 | 8/2 | 16 | 0900+,2b(0859,1533,1933)+! |
| 12 | 140 | 276 | >111 | 249 | 880 | 62 | 6/0 | 25 | 0818+,1n(0816),2n(2031)+! |
| 13 | 154 | 277 | 94 | 256 | 826 | 178 | 5/1 | 284 | ,3n(0257),p(0645,1135 |
| 14 | 181 | 293 | >96 | 270 | 780 | 160 | 3/1 | 146 | 1645 2b(1650) |
| 15 | 165 | 264 | >144 | 252 | 783 | 62 | 4/0 | 36 | 1650 1f(0623),2b(1648),sid |
| 16 | 187 | 196 | >99 | OUT | 791 | 256 | 5/2 | 38 | 1524 2b(1522)(2037) |
| 17 | 177 | 159 | 93 | 242 | 796 | - | 5/1 | 28 | 1720 P(1720),p(1855),ssc |
| 18 | 164 | 110 | 87 | 237 | 809 | 32 | 3/0 | 10 | 1242+p(0920),pca |
| 19 | 148 | 91 | 80 | 230 | 803 | 37 | 7/0 | 40 | 1316 sf(1842),ssc |
| 20 | 158 | 133 | 86 | 210 | 813 | 61 | 4/0 | 14 | ten(1349) |
| 21 | 155 | 139 | 83 | 220 | 841 | 35 | 3/0 | 16 | see a special note |
| 22 | 155 | 128 | 82 | 220 | 844 | 41 | 2/0 | 30 | SIDC NEWS 2-1989 |
| 23 | 145 | 143 | 79 | 216 | 850 | 116 | 0/1 | 34 | P-3b(1921),p(2025) |
| 24 | 150 | 119 | 75 | 217 | 860 | 24 | 1/0 | 9 | |
| 25 | 131 | 108 | 72 | 189 | 858 | 8 | 0/0 | 13 | |
| 26 | 117 | 71 | 72 | 168 | 860 | 21 | 1/0 | 12 | 1309;2n(1252),II+IV,ssc |
| 27 | 102 | 63 | 71 | 164 | - | 28 | 1/0 | 41 | ssc(1343) |
| 28 | 89 | 67 | 69 | 158 | 833 | 10 | 2/0 | 33 | |
| 29 | 95 | 51 | 72 | 158 | - | 6 | 0/0 | 54 | |
| 30 | 70 | 38 | 68 | - | - | - | - | - | |
| 31 | 91 | 38 | 72 | - | - | - | - | - | |

Ri ,Rim: provisional international sunspot-numbers from the S.I.D.C.
PPSI: prompt photometric sunspot-index from the S.I.D.C.in 10-5 w.m-2:the quantity to subtract at the mean solar constant.
600 :600 Mhz solar flux from Humain station (Belgium).
2800:2800 Mhz solar flux from Ottawa (origin:Ursigrams).
COS :thousands of the cosmic ray counts (origin:Ursigrams).
XFI :X-flares index from the S.I.D.C. (origin:Ursigrams).
XI :X-flares index from the Ursigrams (M-flares/X-flares).
Ak :planetary geomagnetic index from Wingst (Germany from Ursigrams).
SEA :sudden enhancements of atmospherics from Uccle & Humain (Belgium).
Remarks:sid(sudden ionospheric disturbance);ssc(sudden storm commencement)
mgst(magnetic storm);s-1-2-3-4(class of flares);II-IV radio-burst;
ten(ten cm radio-burst);P(proton flare);p(proton event)

OBSERVATOIRE ROYAL DE BELGIQUE

DEPARTEMENT 4 RADIOASTRONOMIE ET PHYSIQUE SOLAIRE

NOMBRES RELATIFS DE WOLF JOURNALIERS

PROVISOIRES

PROVISIONAL

SUNSPOT RELATIVE NUMBERS

STATION UCCLE BELGIUM

MARS 1989

| DATE | UT | NOMBRE DE GROUPES | NOMBRE DE TACHES | NOMBRE DE WOLF | NOMB REL ZONE CENTRALE | PSSI 10-6 WM-2 | QUAL | OBS |
|------|------|-------------------------|------------------------|----------------------|------------------------------|----------------------|------|-----|
| 1 | 0957 | 6 | 79 | 139 | 100 | 713. | 2 | ST |
| 2 | 0945 | 6 | 49 | 109 | 64 | 1118. | 1 | VI |
| 3 | 0909 | 7 | 70 | 140 | 29 | 1279. | 2 | ST |
| 5 | 1110 | 5 | 41 | 91 | 33 | 768. | 2 | CG |
| 6 | 0815 | 6 | 27 | 87 | 0 | 722. | 2 | VI |
| 8 | 1115 | 7 | 58 | 128 | 14 | 932. | 2 | VI |
| 9 | 0829 | 9 | 80 | 170 | 36 | 1264. | 2 | VI |
| 10 | 0822 | 10 | 108 | 208 | 28 | 1548. | 2 | VI |
| 12 | 1124 | 7 | 56 | 126 | 37 | 1815. | 3 | HB |
| 13 | 1306 | 11 | 138 | 248 | 57 | 1910. | 1 | AK |
| 14 | 0812 | 10 | 125 | 225 | 61 | 1881. | 1 | VI |
| 15 | 1336 | 10 | 146 | 246 | 84 | 1842. | 3 | ST |
| 16 | 1157 | 11 | 132 | 242 | 86 | 1836. | 1 | VI |
| 17 | 1306 | 11 | 91 | 201 | 77 | 1555. | 1 | ST |
| 18 | 0930 | 13 | 79 | 209 | 36 | 1324. | 3 | PC |
| 20 | 0806 | 11 | 91 | 201 | 117 | 1757. | 2 | VI |
| 21 | 0926 | 12 | 133 | 253 | 149 | 2699. | 2 | ST |
| 23 | 0815 | 8 | 97 | 177 | 42 | 1452. | 2 | VI |
| 25 | 0940 | 9 | 97 | 187 | 58 | 1095. | 4 | ST |
| 26 | 0810 | 9 | 75 | 165 | 83 | 1217. | 3 | HB |
| 27 | 0910 | 7 | 60 | 130 | 76 | 1186. | 3 | AK |
| 28 | 1023 | 7 | 53 | 123 | 71 | 1023. | 3 | VI |
| 29 | 1153 | 7 | 45 | 115 | 22 | 683. | 2 | ST |
| 30 | 1124 | 5 | 29 | 79 | 12 | 617. | 1 | VI |
| 31 | 0818 | 6 | 53 | 113 | 18 | 536. | 2 | ST |

LE SOLEIL A ETE OBSERVE 25 JOURS SUR 31 POSSIBLES
LE NOMBRE RELATIF DE WOLF MOYEN EST DE 164.5

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NORMALISED UCCLE OBSERVATIONAL SUNSPOT NUMBERS

| U* = K*U FOR 1989 | | | | MARCH | | | | | |
|-------------------|-----|----|-----|-------|-----|----|-----|----|-----|
| K* = .889 (*) | | | | | | | | | |
| 1 | 123 | 7 | *** | 13 | 220 | 19 | *** | 25 | 166 |
| 2 | 96 | 8 | 113 | 14 | 199 | 20 | 178 | 26 | 146 |
| 3 | 124 | 9 | 151 | 15 | 218 | 21 | 224 | 27 | 115 |
| 4 | *** | 10 | 184 | 16 | 215 | 22 | *** | 28 | 109 |
| 5 | 80 | 11 | *** | 17 | 178 | 23 | 157 | 29 | 102 |
| 6 | 77 | 12 | 111 | 18 | 185 | 24 | *** | 30 | 70 |
| | | | | | | | | 31 | 100 |

THE SUN WAS OBSERVED 25 DAYS ON 31 POSSIBLE
 THE NORMALISED RELATIVE MONTHLY MEAN WOLF NUMBER IS 145

* K* IS THE MEAN OF THE MONTHLY K'S FOR THE LAST FIVE YEARS

UCCLE OBSERVATIONAL MAJOR SUNSPOTS FOR 1989 MARCH
 E AND F BRUNNER'S TYPE GROUPS

| UCCLE NO | EAST LIMB DATE | DATE AND TYPE | | | WEST LIMB DATE |
|----------|----------------|---------------|--------|----------|----------------|
| | | IST OBS | CMP | LAST OBS | |
| 26-1812 | 2 15.7 | 17 A | 2 22.4 | 1 G | 3 1.2 |
| 31-1812 | 2 22.6 | 24 C | 3 1.3 | 3 B | 3 8.1 |
| 37-1812 | 2 22.7 | 27 A | 3 1.5 | 6 G | 3 8.2 |
| 1-1813 | 2 26.3 | 1 B | 3 5.1 | 10 J | 3 11.8 |
| 7-1813 | 3 5.2 | 6 E | 3 12.0 | 18 F | 3 18.7 |
| 29-1813 | 3 14.8 | 17 H | 3 21.5 | 27 H | 3 28.3 |
| 31-1813 | 3 12.6 | 18 A | 3 19.3 | 23 G | 3 26.1 |

PROBABLE RETURN OF MAJOR GROUPS FOR 1989 APRIL

| NO | NEW EAST LIMB | NEW CMP | NEW WEST LIMB |
|----|---------------|---------|---------------|
| 37 | 3 22.0 | 3 28.8 | 4 4.5 |
| 7 | 4 2.5 | 4 9.3 | 4 16.0 |