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JUNE 1999 NUMBER 658 - Part I

# Solar-Geophysical Data prompt reports

Data for April, May 1999 and Late Data

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**NATIONAL GEOPHYSICAL DATA CENTER**
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Boulder, Colorado

Subscription information is on the inside back cover.

# SOLAR-GEOPHYSICAL DATA

Number 658

(Issued in Two Parts)

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Solar-Terrestrial Physics Division

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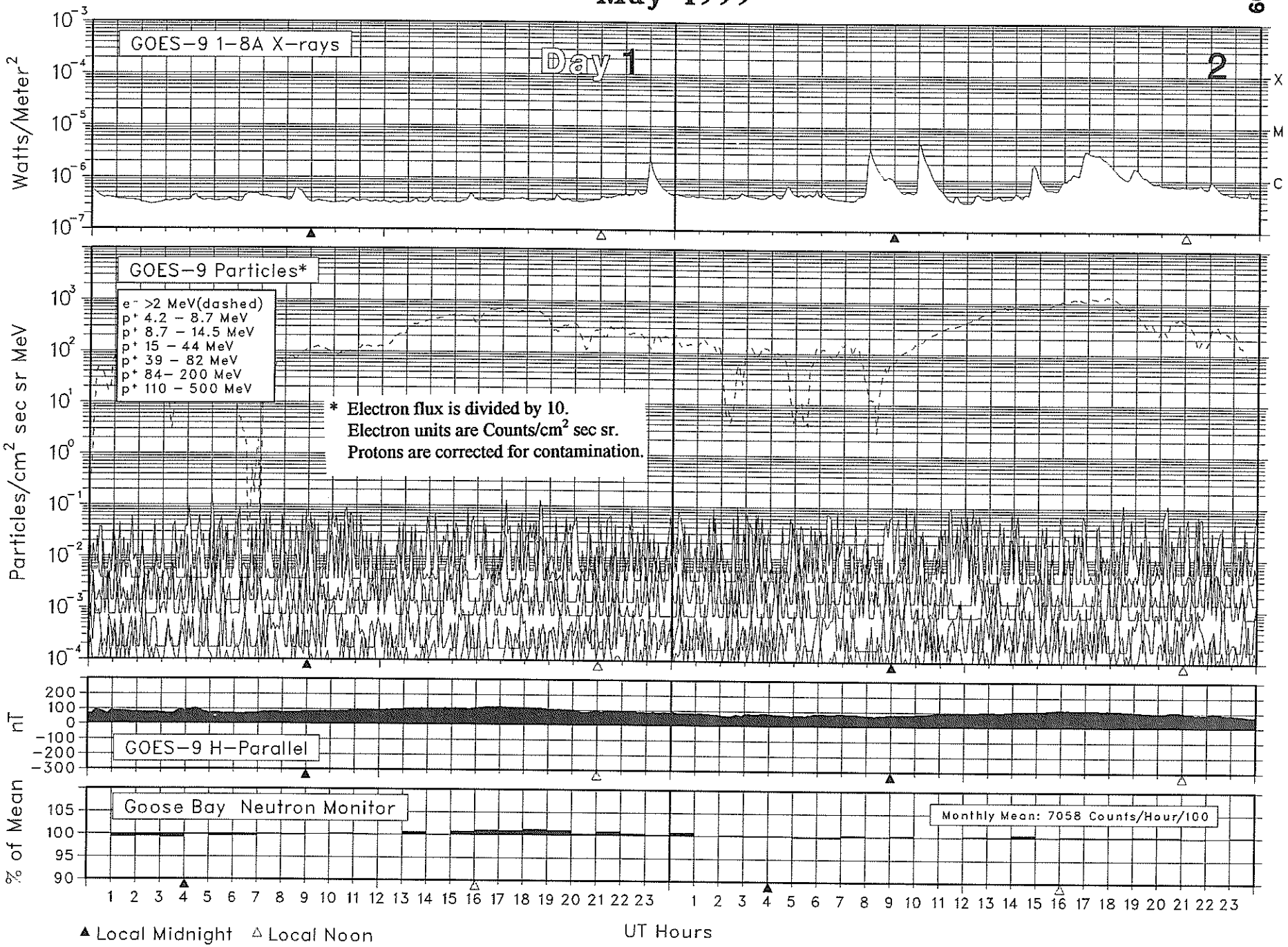
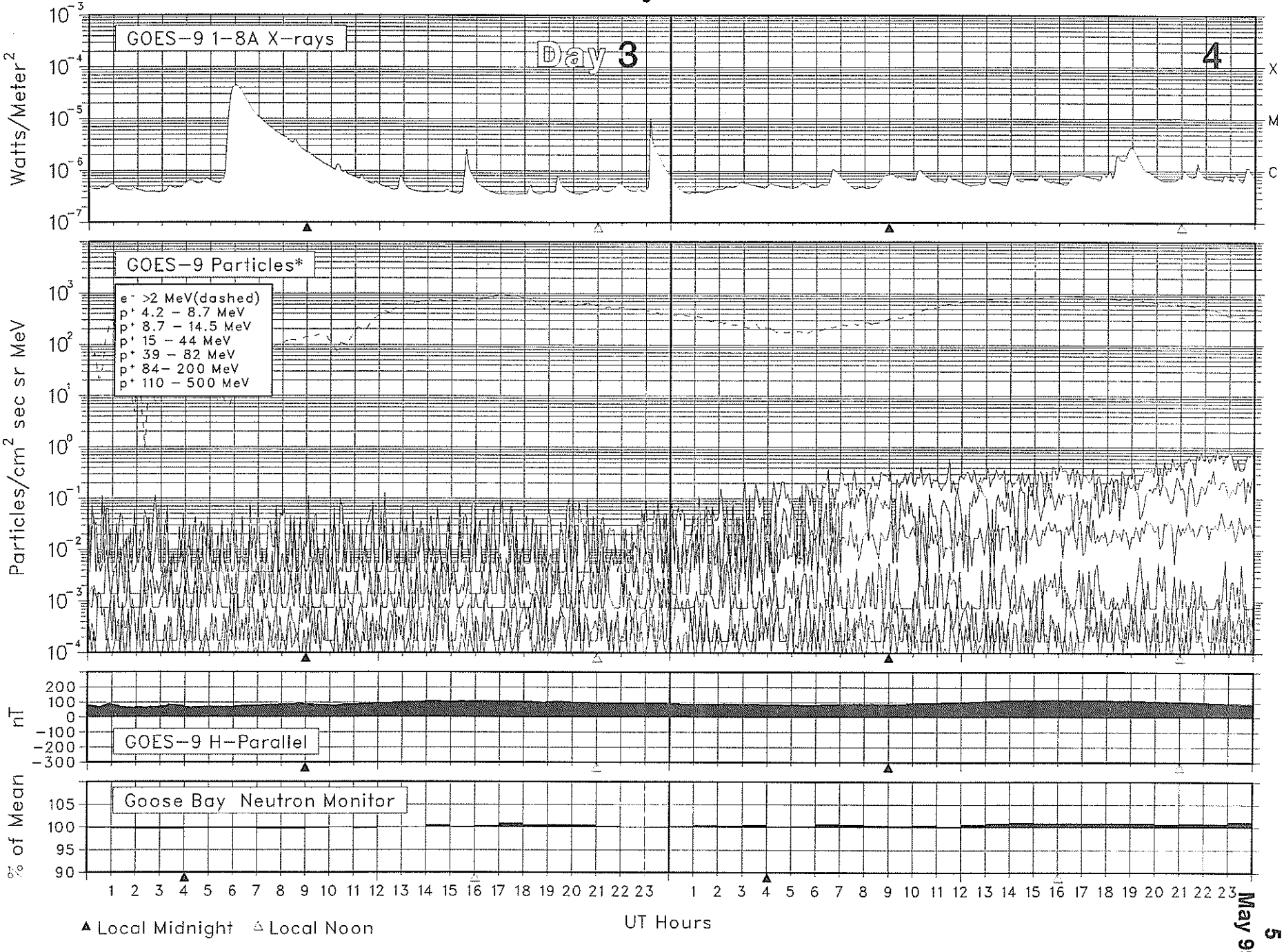


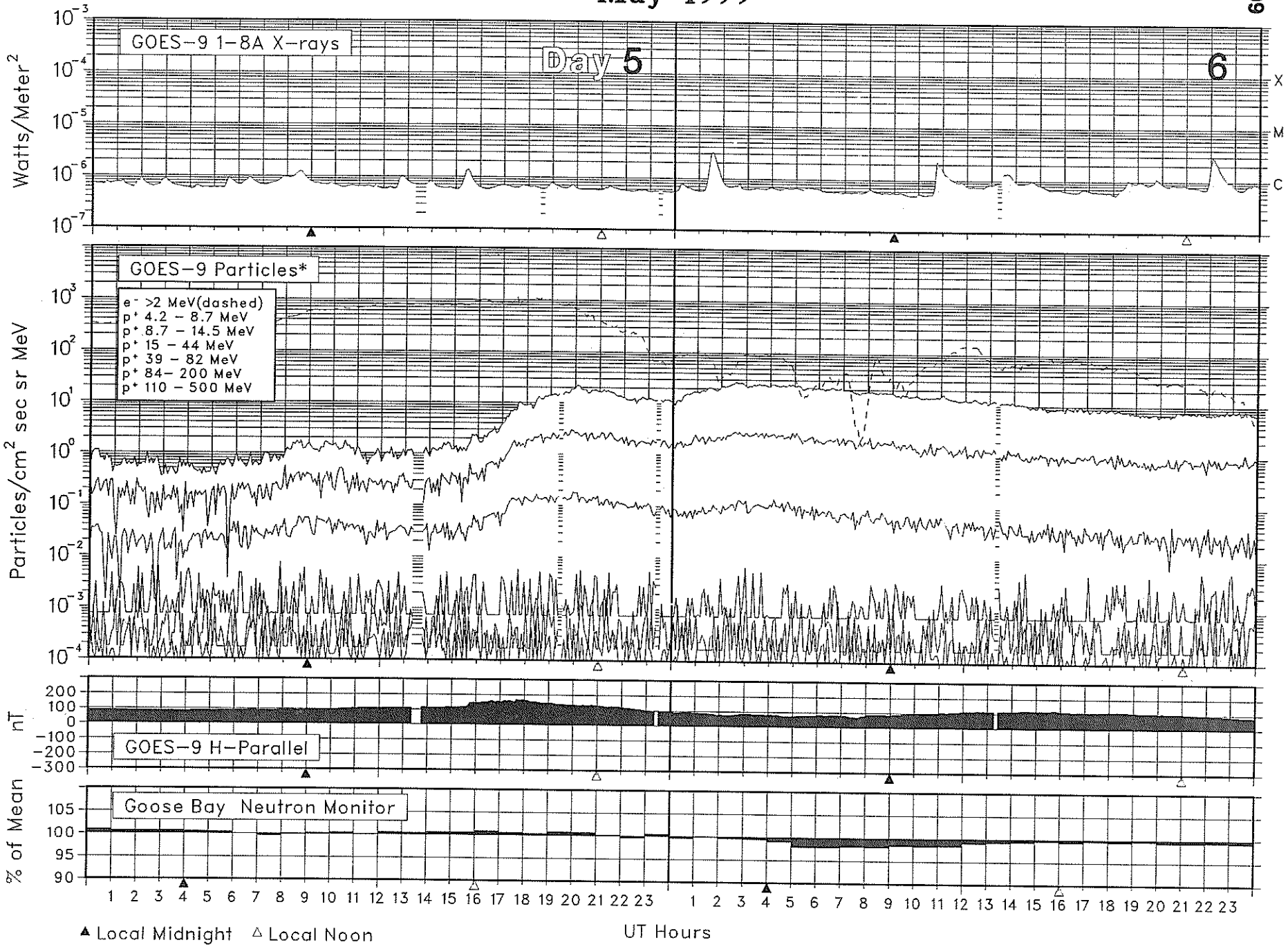
# SOLAR-TERRESTRIAL ENVIRONMENT

## May 1999



# SOLAR-TERRESTRIAL ENVIRONMENT
## May 1999





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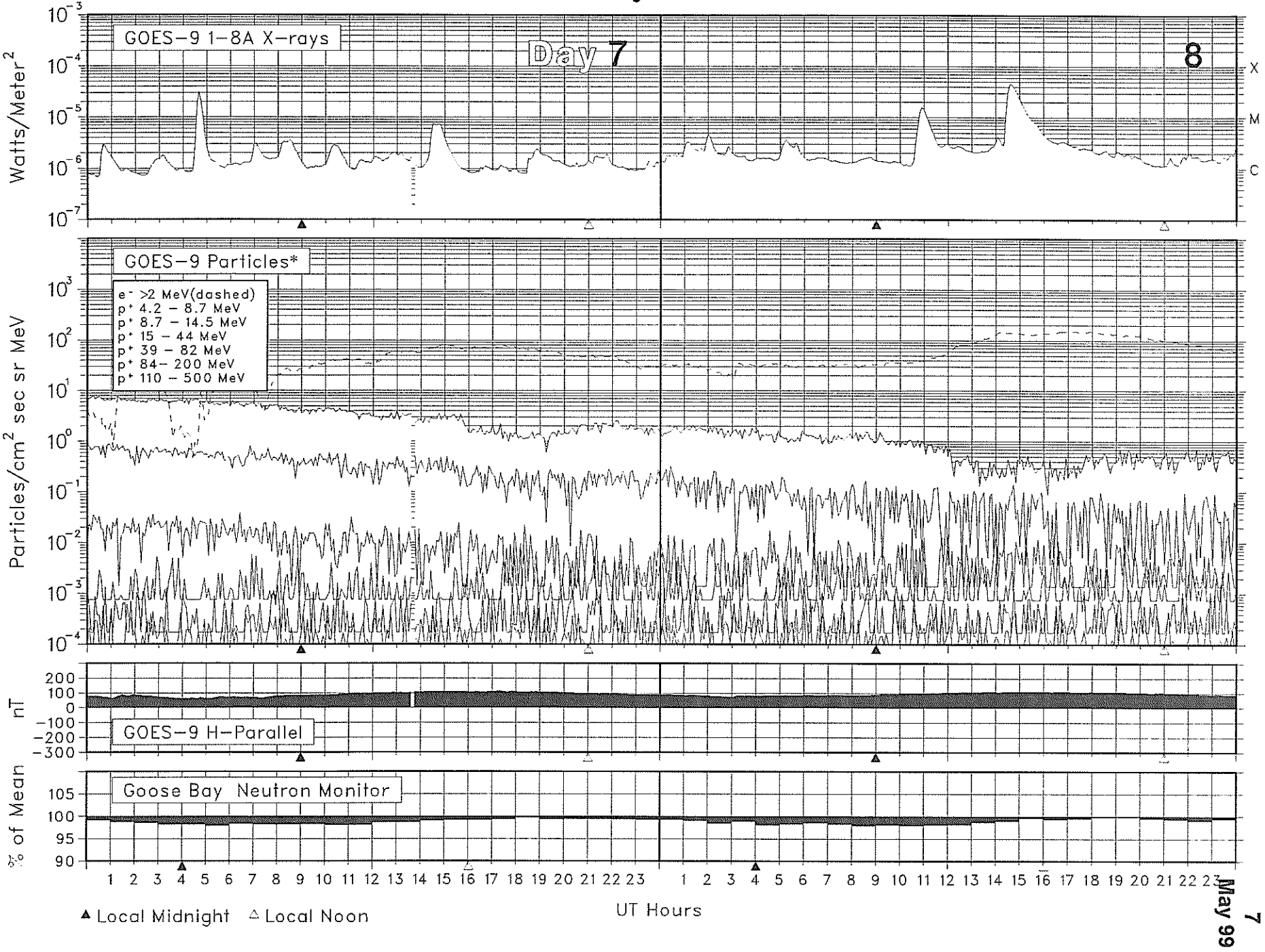

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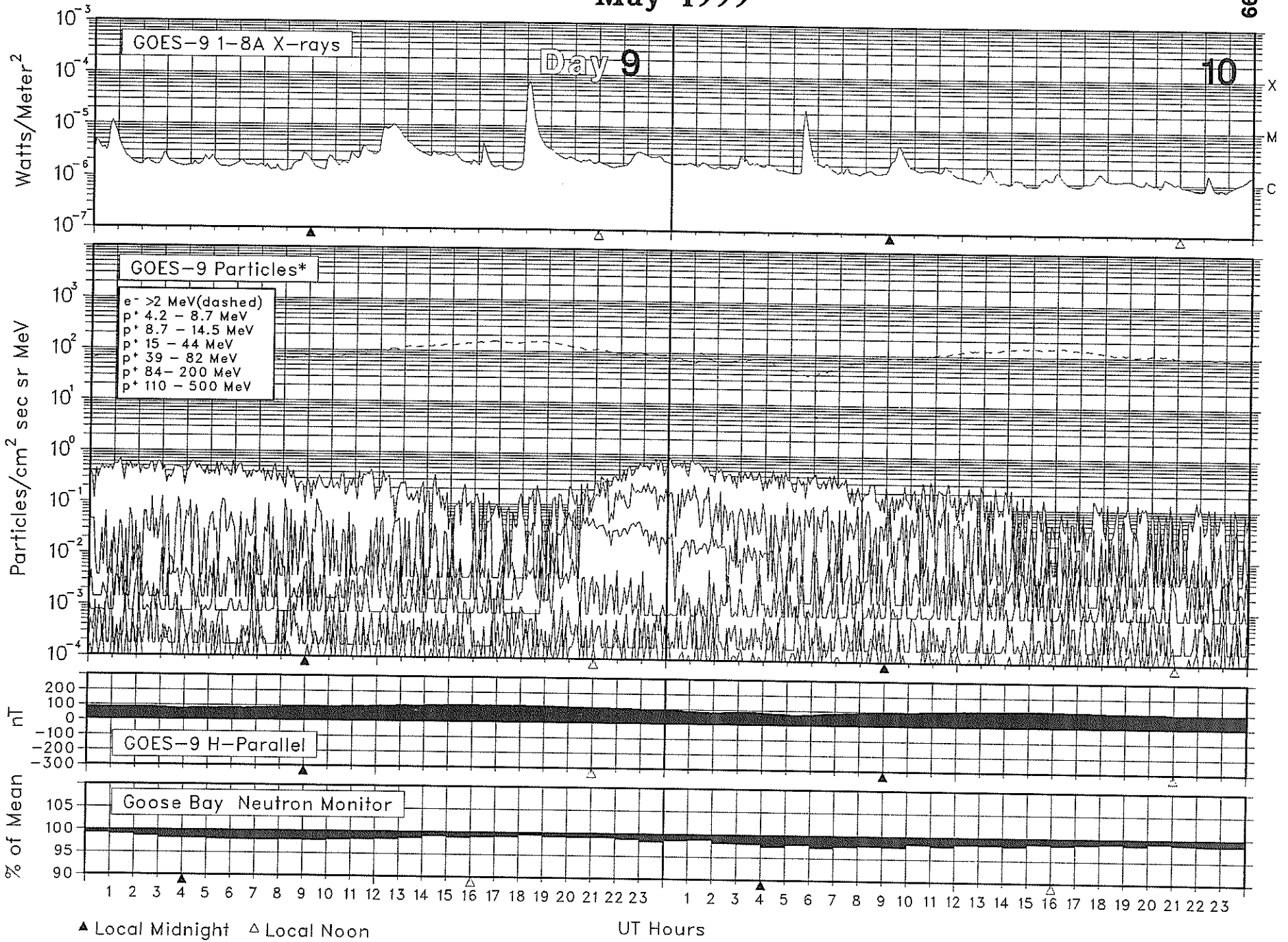
## May 1999





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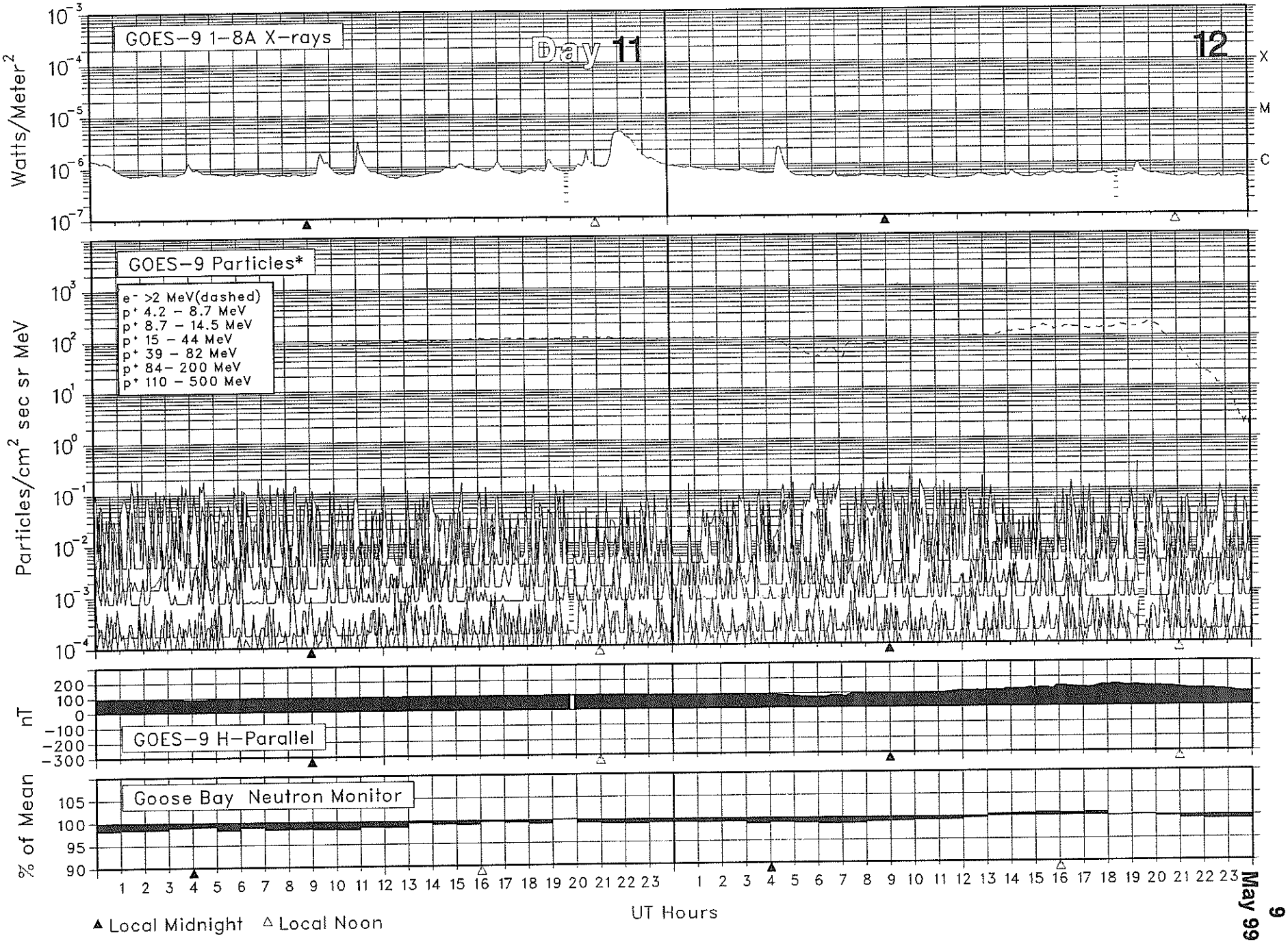

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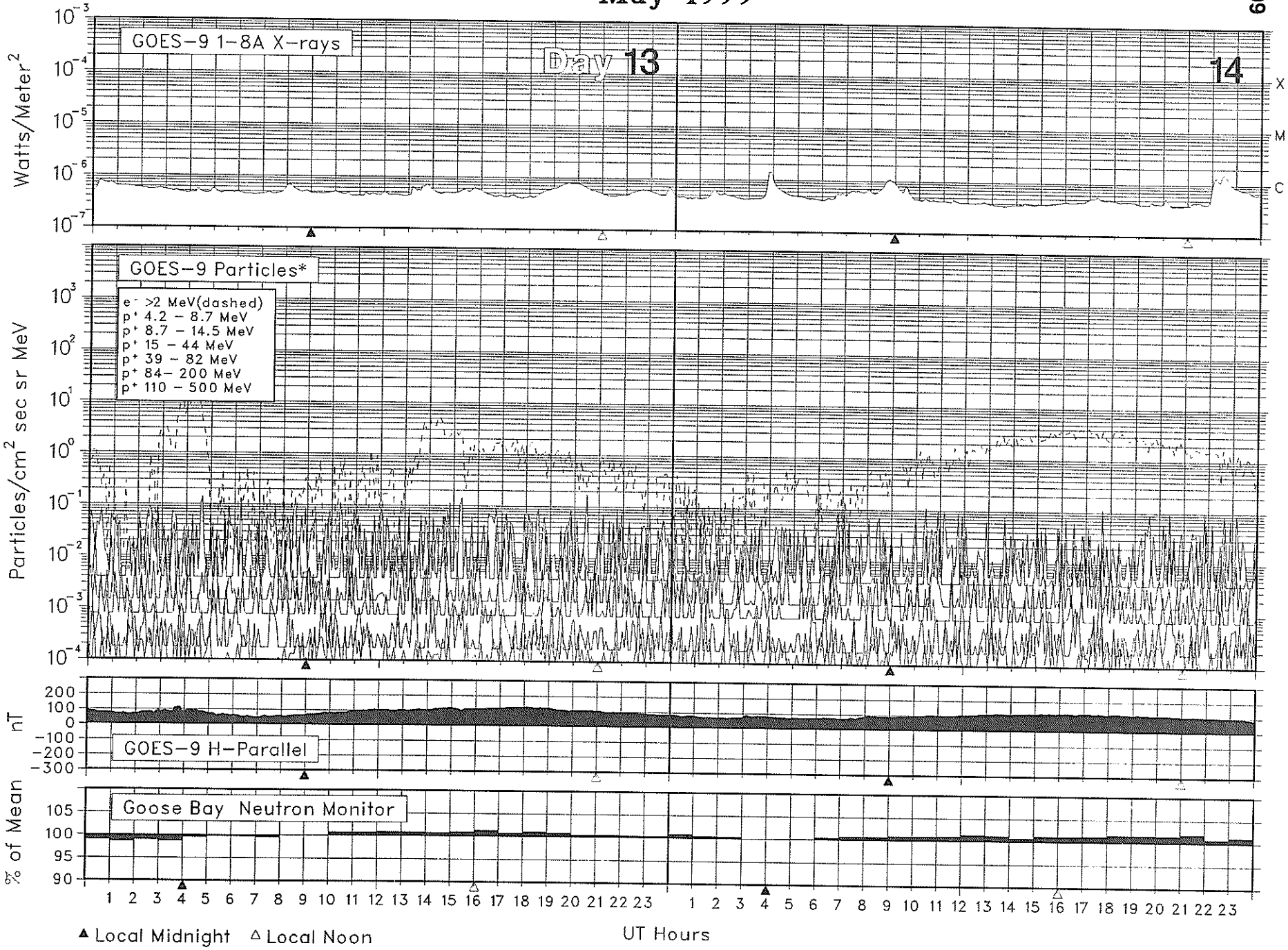
## May 1999





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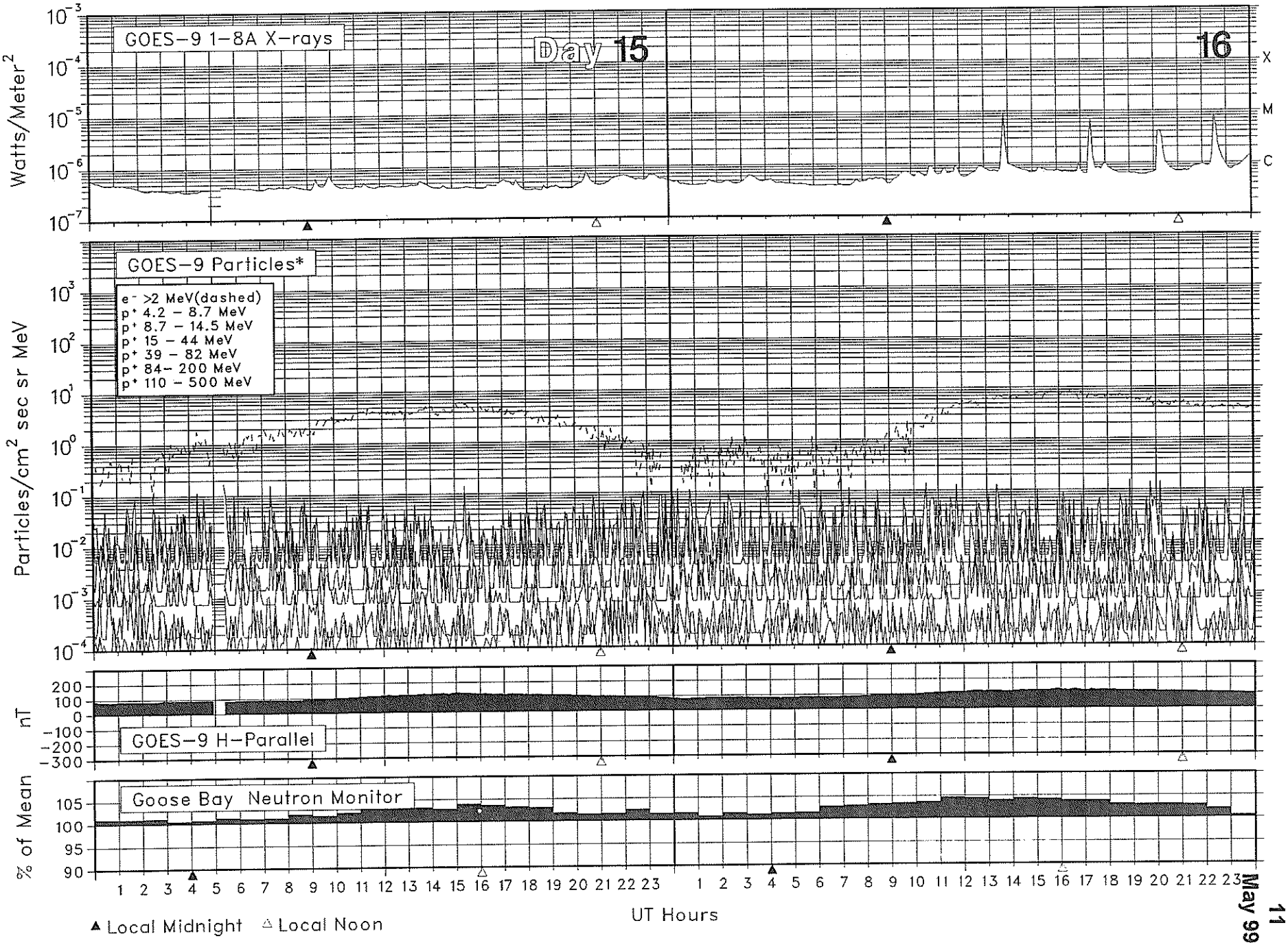

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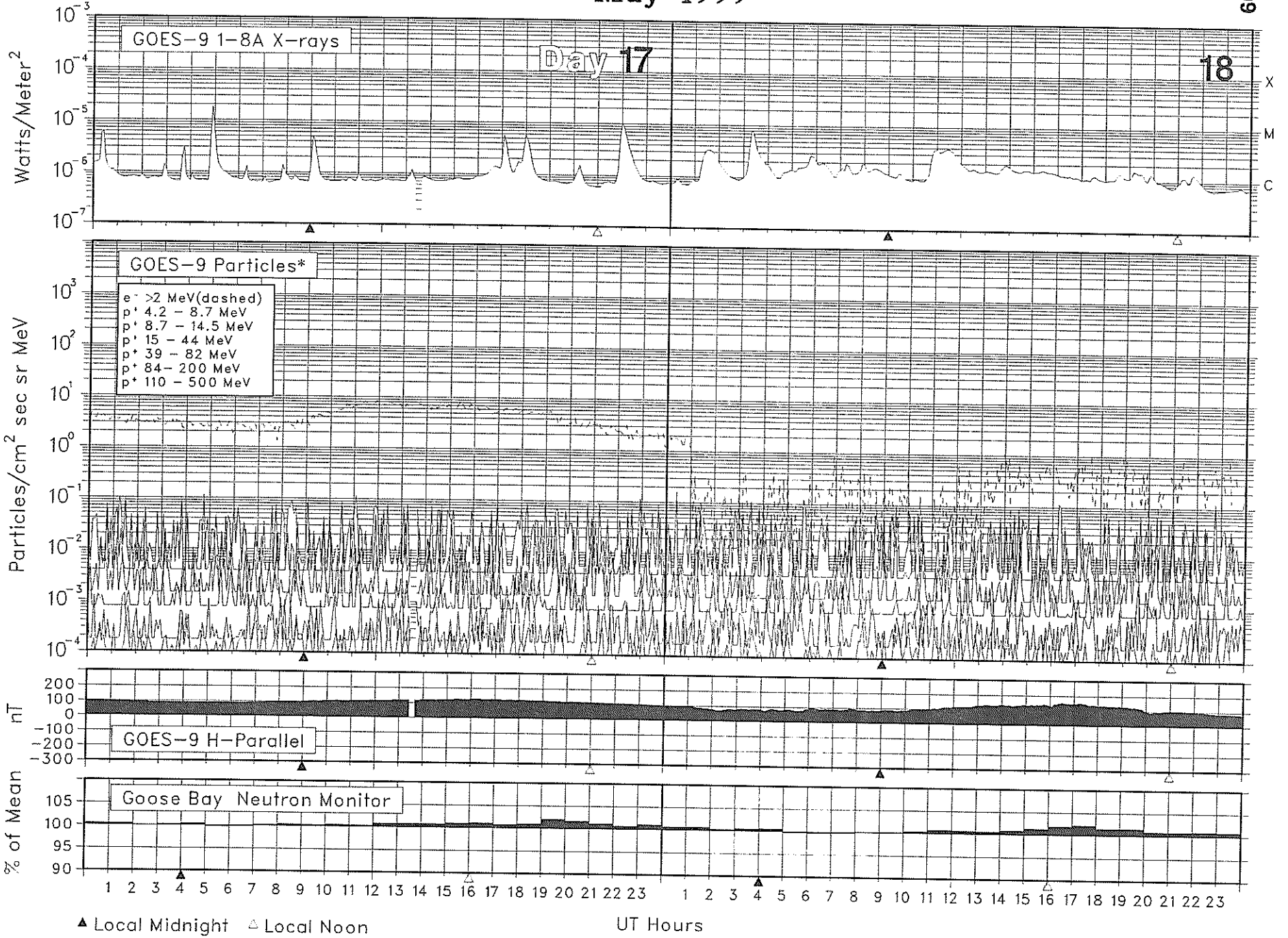

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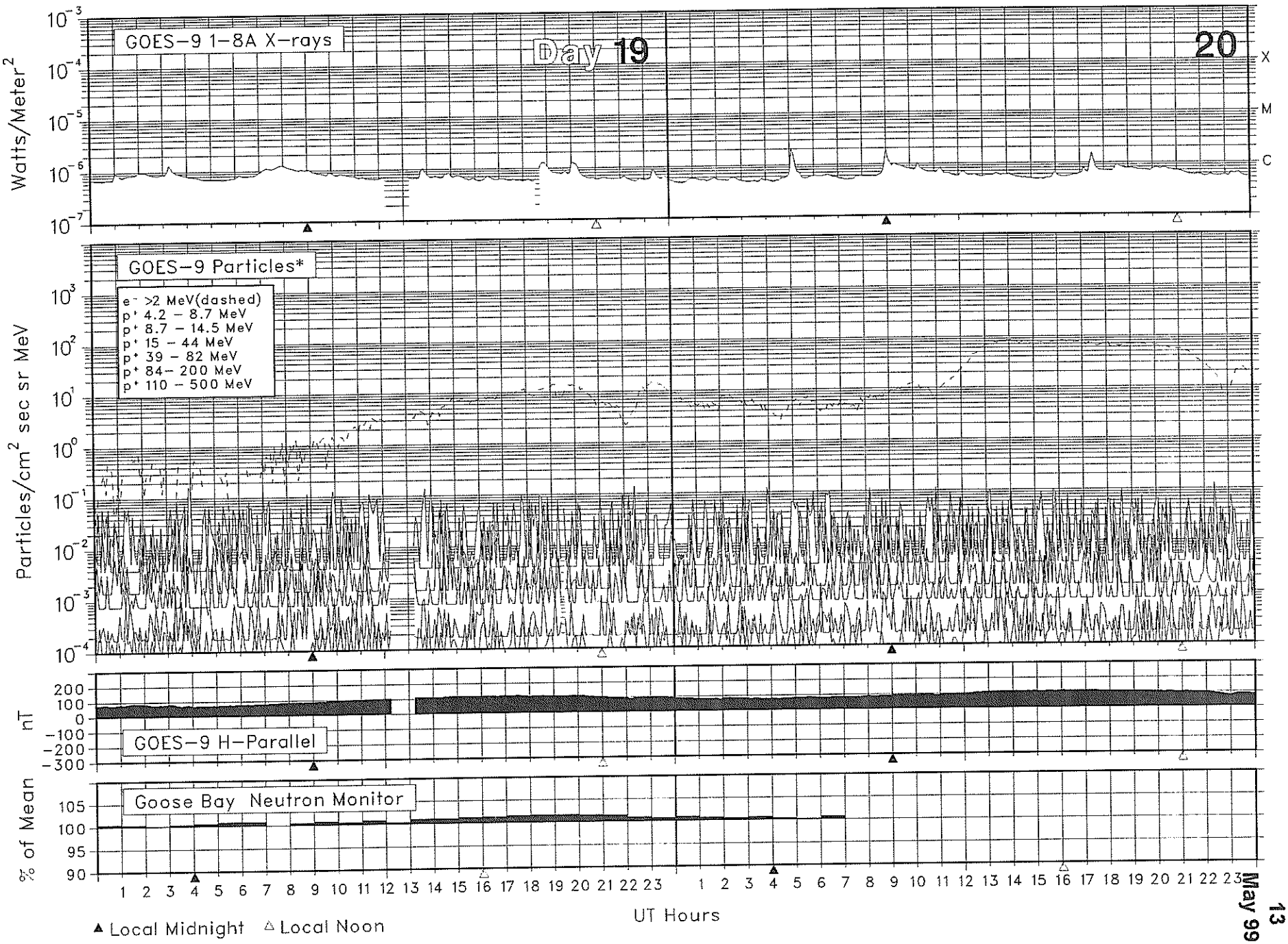
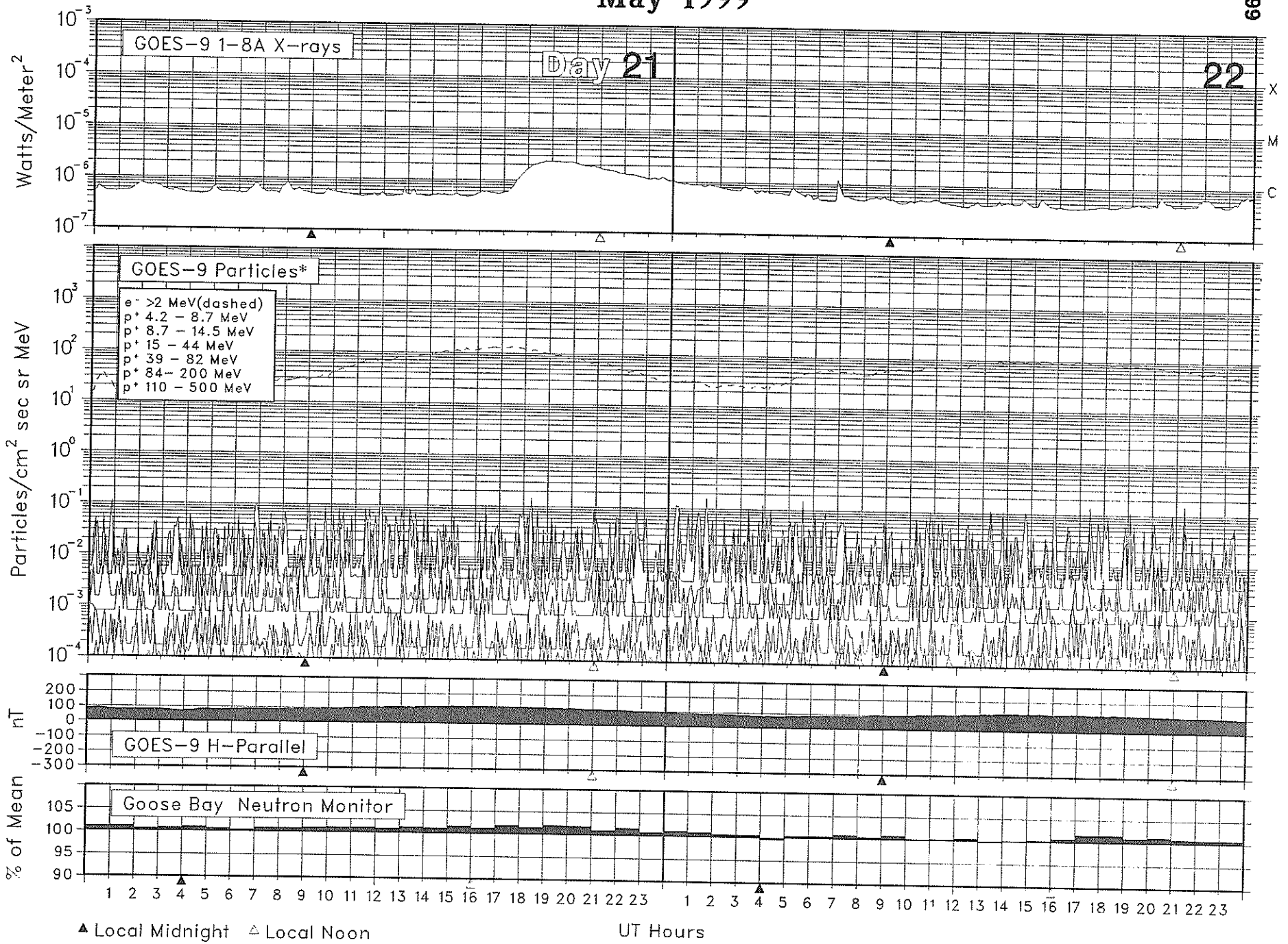


# SOLAR-TERRESTRIAL ENVIRONMENT
## May 1999





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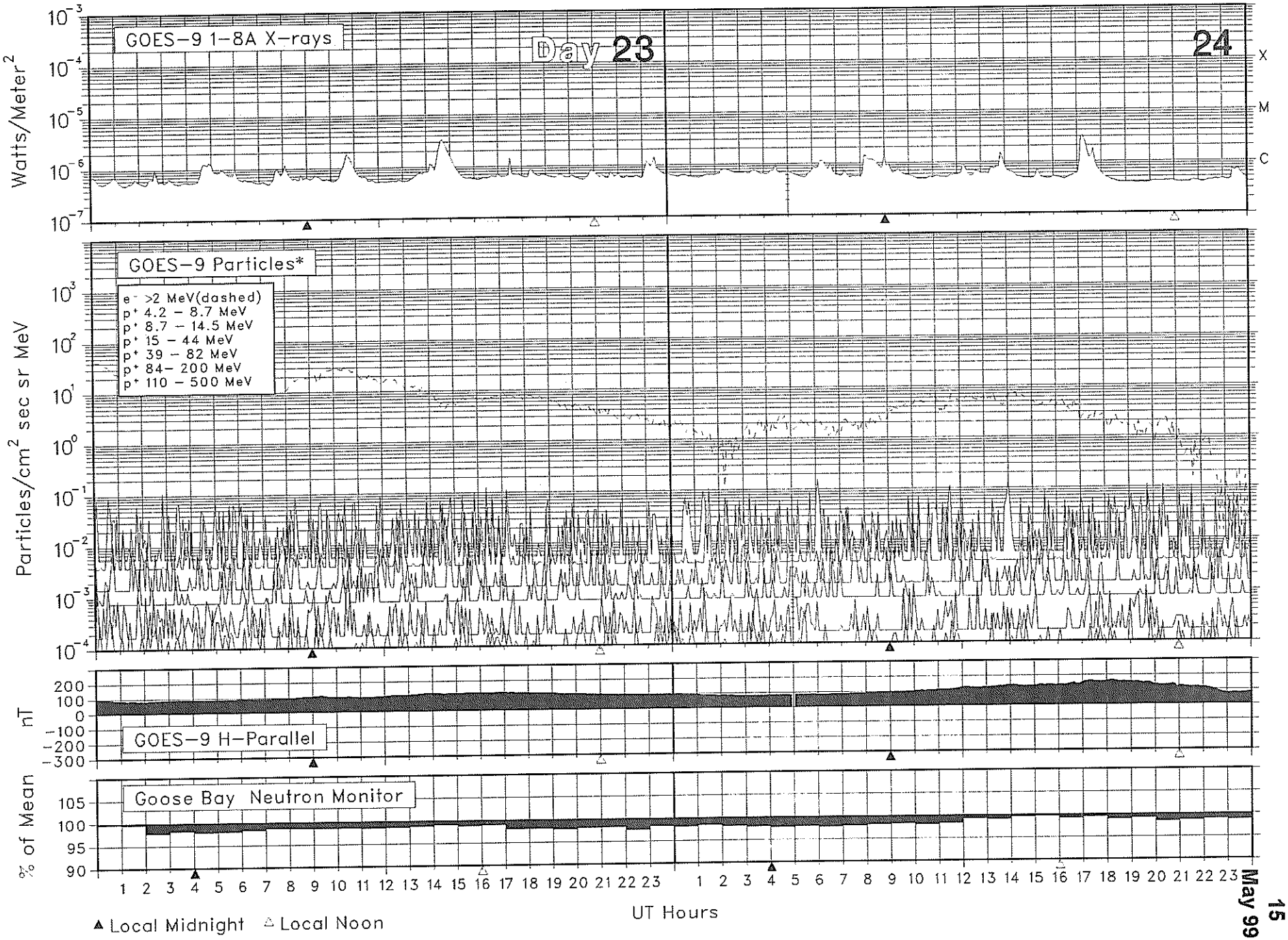
## May 1999



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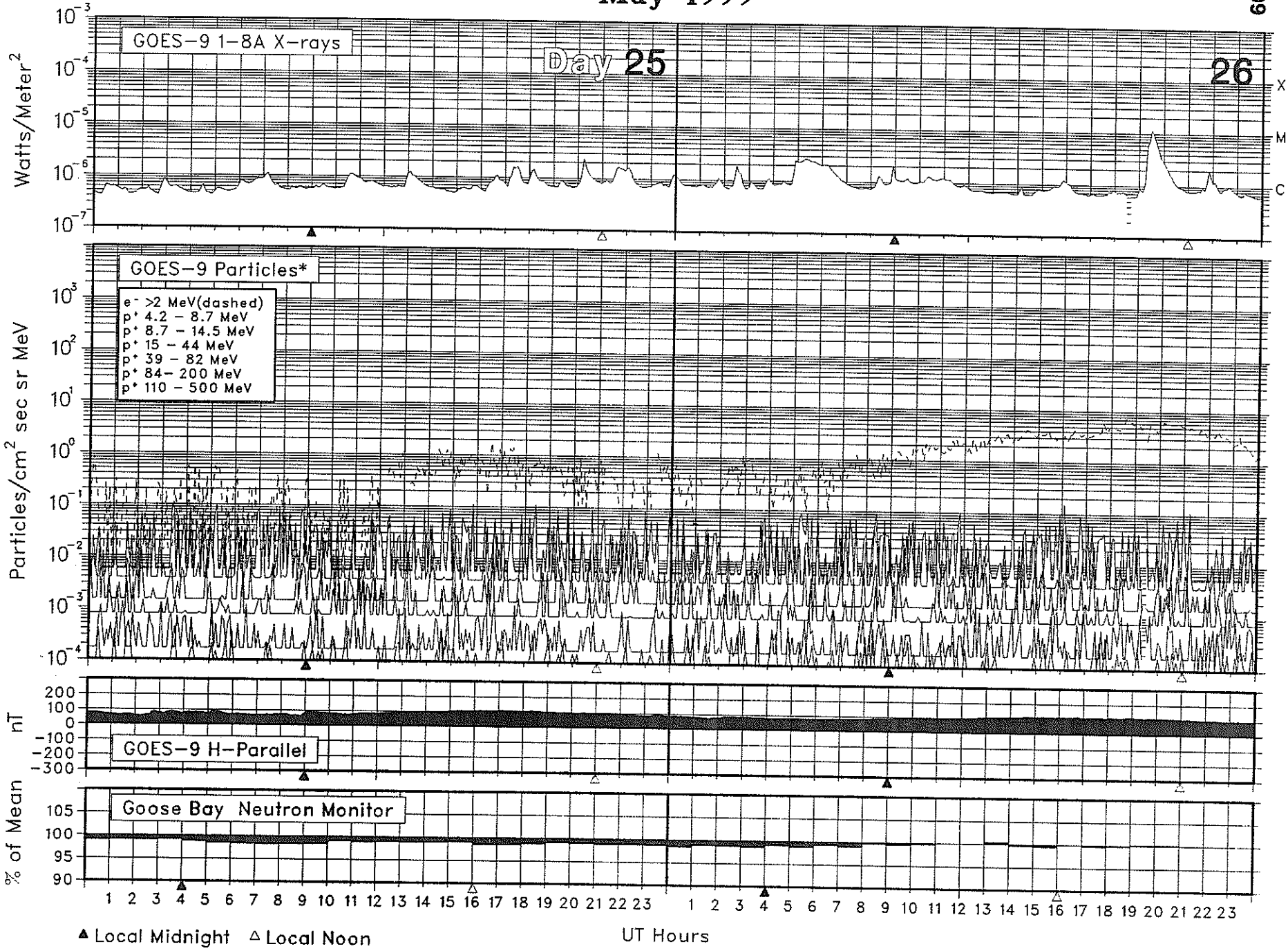
## May 1999



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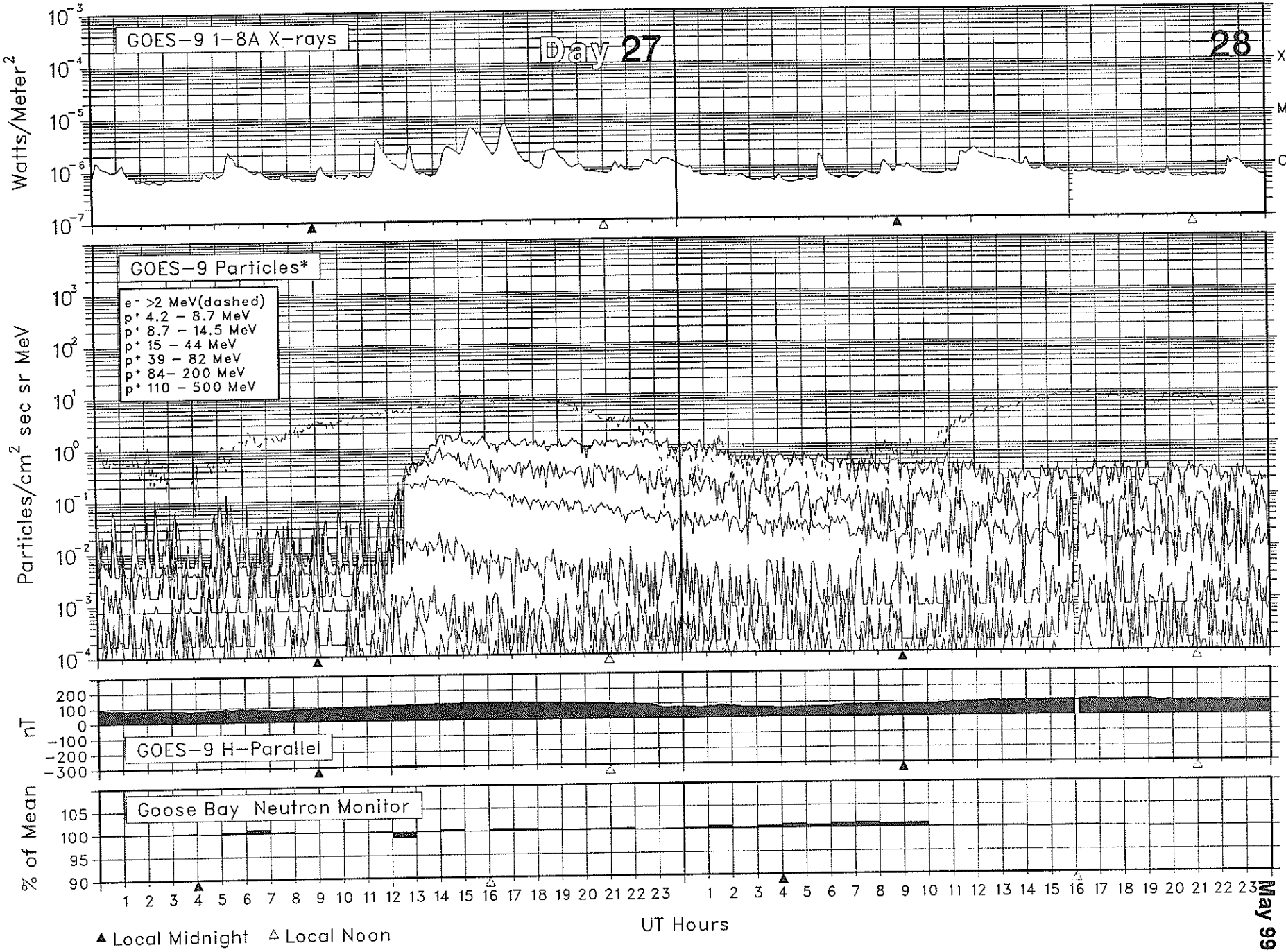

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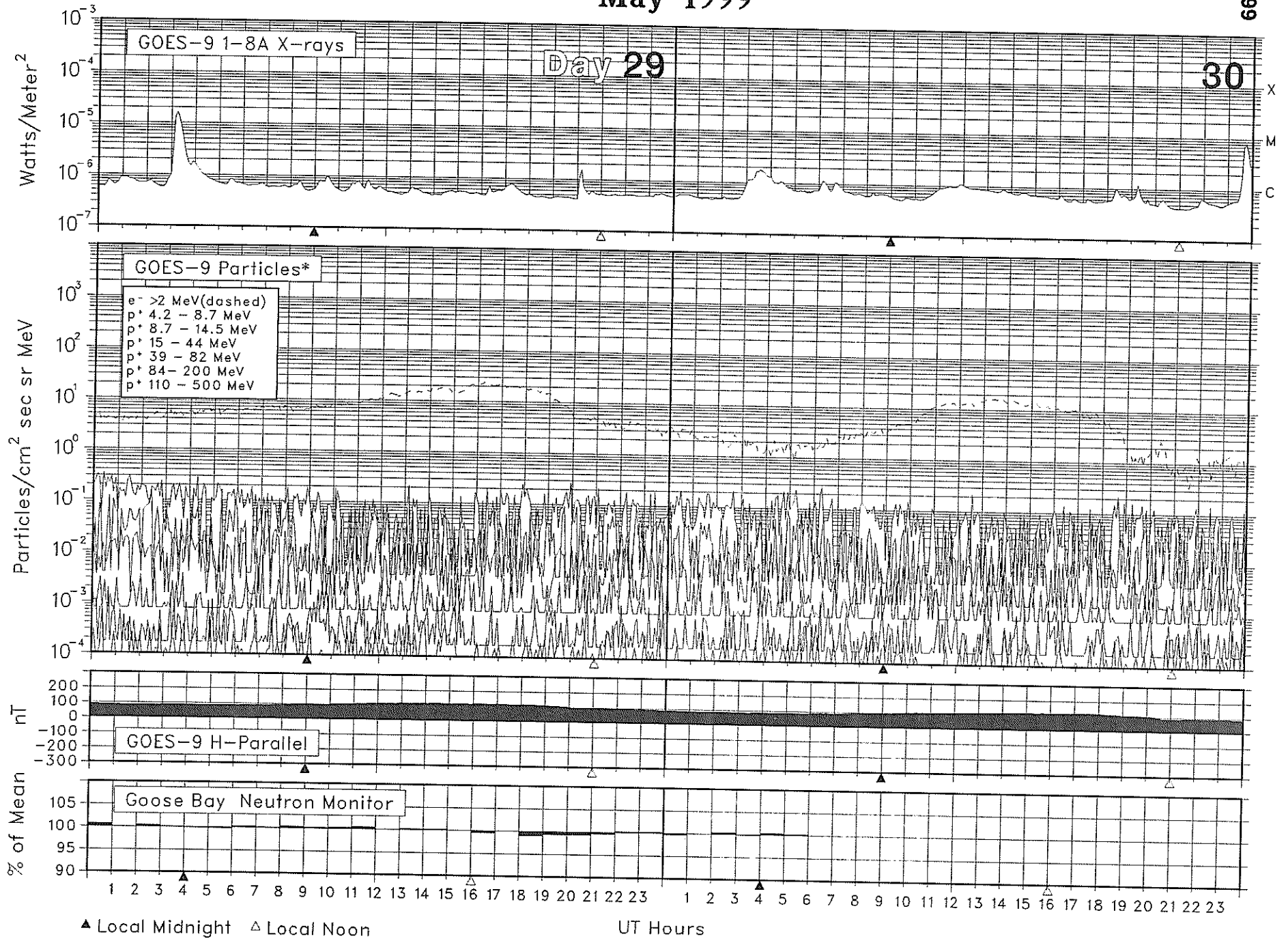

# SOLAR-TERRESTRIAL ENVIRONMENT
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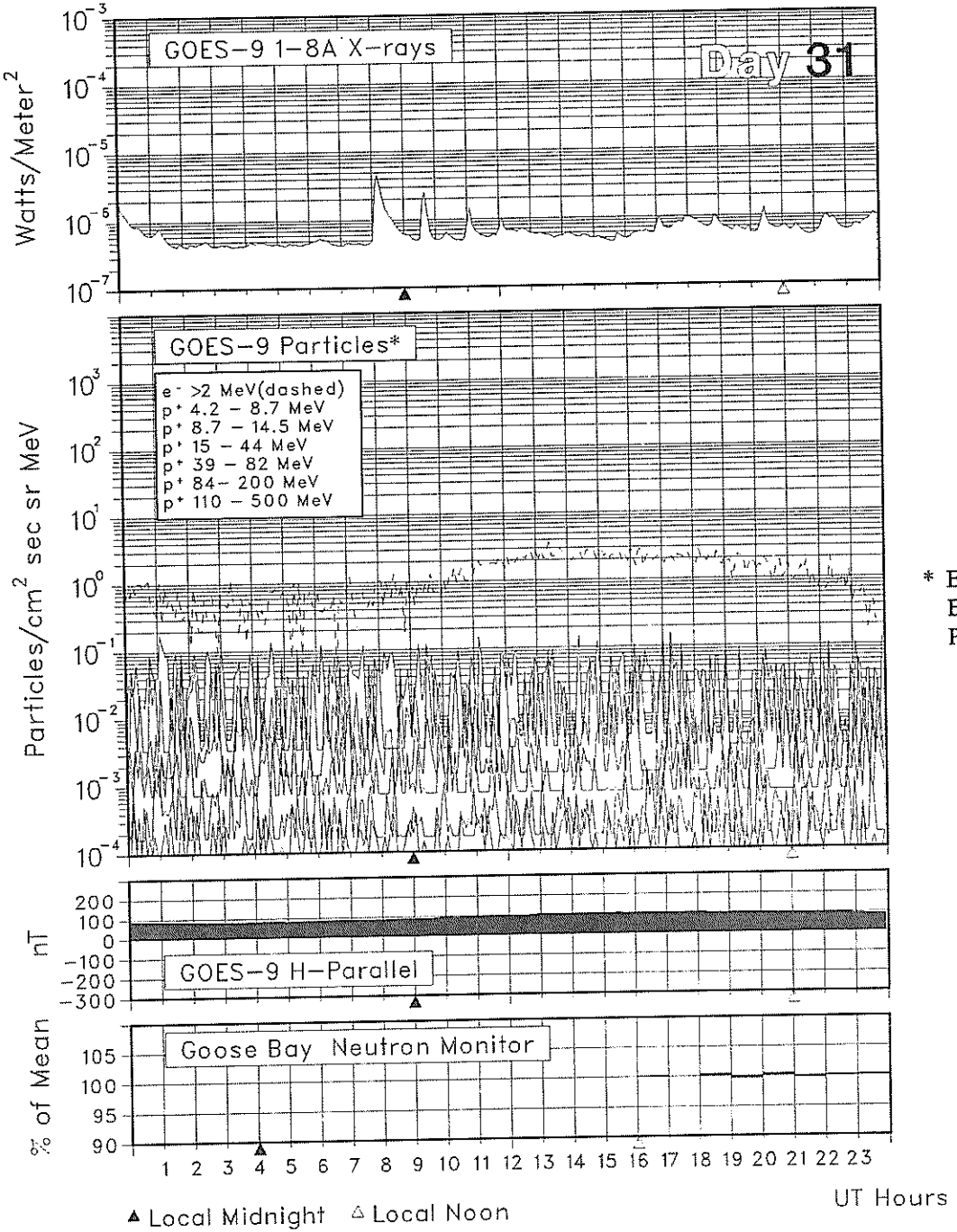



* Electron flux is divided by 10.
Electron units are Counts/cm$^2$ sec sr.
Protons are corrected for contamination.

# A L E R T  P E R I O D S
## The International Space Environment Service

MAY 1999

| Julian Day | Date of Issue | Date of Obs | Wolf No. | 10-cm Solar Flux | A-index | Location | | Flares | | | Date of Forecast | Region Forecast(1) | Geoadvice(1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lat | Long | Optical | M | X | | | |
| 121 | 01 | 30 | 80 | 124 | 18 | N32 | W35 | 0 | 0 | 0 | 01 | Q | SOL: Eruptive |
| | | | | | | N21 | W28 | 3 | 0 | 0 | 01 | E | MAG: Active |
| | | | | | | N16 | E62 | 1 | 0 | 0 | 01 | E | PRO: Quiet |
| | | | | | | N27 | E68 | 0 | 0 | 0 | 01 | Q | |
| 122 | 02 | 01 | 92 | 126 | 15 | N32 | W45 | 0 | 0 | 0 | 02 | Q | SOL: Eruptive |
| | | | | | | N22 | W40 | 1 | 0 | 0 | 02 | E | MAG: Active |
| | | | | | | N17 | E49 | 0 | 0 | 0 | 02 | Q | PRO: Quiet |
| | | | | | | N26 | E53 | 0 | 0 | 0 | 02 | Q | |
| | | | | | | S15 | E63 | 0 | 0 | 0 | 02 | Q | |
| 123 | 03 | 02 | 136 | 136 | 10 | N30 | W55 | 0 | 0 | 0 | 03 | Q | SOL: Eruptive |
| | | | | | | N21 | W55 | 2 | 0 | 0 | 03 | E | MAG: Quiet |
| | | | | | | N17 | E34 | 4 | 0 | 0 | 03 | E | PRO: Quiet |
| | | | | | | N23 | W03 | 0 | 0 | 0 | 03 | Q | |
| | | | | | | N27 | E38 | 1 | 0 | 0 | 03 | Q | |
| | | | | | | S15 | E51 | 0 | 0 | 0 | 03 | Q | |
| | | | | | | S13 | E10 | 0 | 0 | 0 | 03 | Q | |
| | | | | | | N16 | E53 | 0 | 0 | 0 | 03 | Q | |
| 124 | 04 | 03 | 95 | 127 | 9 | N20 | W69 | 4 | 0 | 0 | 04 | E | SOL: Eruptive |
| | | | | | | N18 | E24 | 4 | 1 | 0 | 04 | E | MAG: Quiet |
| | | | | | | N23 | W16 | 1 | 0 | 0 | 04 | Q | PRO: Quiet |
| | | | | | | N28 | E25 | 0 | 0 | 0 | 04 | Q | |
| | | | | | | S13 | E36 | 0 | 0 | 0 | 04 | Q | |
| | | | | | | S14 | W03 | 0 | 0 | 0 | 04 | Q | |
| 125 | 05 | 04 | 100 | 139 | 5 | N22 | W80 | 0 | 0 | 0 | 05 | E | SOL: Eruptive |
| | | | | | | N18 | E10 | 0 | 0 | 0 | 05 | E | MAG: Active |
| | | | | | | N22 | W31 | 0 | 0 | 0 | 05 | Q | PRO: Quiet |
| | | | | | | N26 | E12 | 3 | 0 | 0 | 05 | Q | |
| | | | | | | S14 | W17 | 0 | 0 | 0 | 05 | Q | |
| | | | | | | N18 | E65 | 0 | 0 | 0 | 05 | Q | |
| 126 | 06 | 05 | 145 | 141 | 5 | N18 | W02 | 0 | 0 | 0 | 06 | E | SOL: Eruptive |
| | | | | | | N20 | W44 | 0 | 0 | 0 | 06 | Q | MAG: Active |
| | | | | | | N26 | E00 | 0 | 0 | 0 | 06 | Q | PRO: Quiet |
| | | | | | | S16 | E14 | 0 | 0 | 0 | 06 | Q | |
| | | | | | | S14 | W30 | 0 | 0 | 0 | 06 | Q | |
| | | | | | | N16 | E14 | 0 | 0 | 0 | 06 | Q | |
| | | | | | | N18 | E52 | 0 | 0 | 0 | 06 | Q | |
| | | | | | | S40 | W14 | 0 | 0 | 0 | 06 | Q | |
| | | | | | | N05 | E74 | 0 | 0 | 0 | 06 | Q | |
| | | | | | | S18 | E74 | 0 | 0 | 0 | 06 | Q | |
| 127 | 07 | 06 | 141 | 147 | 11 | N18 | W16 | 3 | 0 | 0 | 07 | E | SOL: Eruptive |
| | | | | | | N20 | W56 | 0 | 0 | 0 | 07 | Q | MAG: Quiet |
| | | | | | | N26 | W11 | 1 | 0 | 0 | 07 | Q | PRO: Quiet |
| | | | | | | S15 | E01 | 0 | 0 | 0 | 07 | Q | |
| | | | | | | S14 | W45 | 0 | 0 | 0 | 07 | Q | |
| | | | | | | N19 | E38 | 0 | 0 | 0 | 07 | Q | |
| | | | | | | N03 | E60 | 1 | 0 | 0 | 07 | Q | |
| | | | | | | S18 | E60 | 1 | 0 | 0 | 07 | Q | |
| | | | | | | N20 | E67 | 0 | 0 | 0 | 07 | Q | |
| | | | | | | S24 | E51 | 0 | 0 | 0 | 07 | Q | |
| 128 | 08 | 07 | 162 | 163 | 7 | N16 | W31 | 4 | 0 | 0 | 08 | E | SOL: Eruptive |
| | | | | | | N19 | W70 | 1 | 0 | 0 | 08 | Q | MAG: Quiet |
| | | | | | | N18 | E24 | 0 | 0 | 0 | 08 | Q | PRO: Quiet |
| | | | | | | N03 | E46 | 0 | 0 | 0 | 08 | Q | |
| | | | | | | S18 | E47 | 0 | 0 | 0 | 08 | Q | |
| | | | | | | N21 | E54 | 0 | 0 | 0 | 08 | Q | |
| | | | | | | S24 | E38 | 4 | 0 | 0 | 08 | Q | |
| | | | | | | N19 | W60 | 7 | 0 | 0 | 08 | Q | |
| | | | | | | N10 | W33 | 1 | 0 | 0 | 08 | Q | |
| | | | | | | N13 | E45 | 6 | 0 | 0 | 08 | Q | |
| | | | | | | S28 | E70 | 0 | 0 | 0 | 08 | Q | |

# A L E R T  P E R I O D S
## The International Space Environment Service

### MAY 1999

| Julian Day | Date of Issue | Date of Obs | Wolf No. | 10-cm Solar Flux | A-index | Location | | Flares | | | Date of Forecast | Region Forecast(1) | Geoadvice(1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lat | Long | Optical | M | X | | | |
| 129 | 09 | 08 | 192 | 172 | 5 | N17 | W49 | 1 | 0 | 0 | 09 | Q | SOL: Active |
| | | | | | | N19 | W80 | 3 | 1 | 0 | 09 | Q | MAG: Quiet |
| | | | | | | N19 | E08 | 1 | 0 | 0 | 09 | E | PRO: Quiet |
| | | | | | | N04 | E34 | 0 | 0 | 0 | 09 | E | |
| | | | | | | S17 | E35 | 0 | 0 | 0 | 09 | Q | |
| | | | | | | N22 | E42 | 0 | 0 | 0 | 09 | E | |
| | | | | | | S24 | E25 | 1 | 0 | 0 | 09 | Q | |
| | | | | | | N19 | W73 | 20 | 0 | 0 | 09 | E | |
| | | | | | | N11 | W46 | 0 | 0 | 0 | 09 | Q | |
| | | | | | | N14 | E31 | 0 | 0 | 0 | 09 | E | |
| | | | | | | S28 | E59 | 0 | 0 | 0 | 09 | Q | |
| | | | | | | N22 | E67 | 3 | 1 | 0 | 09 | E | |
| 130 | 10 | 09 | 192 | 178 | 3 | N17 | W60 | 1 | 1 | 0 | 10 | E | SOL: Active |
| | | | | | | N20 | W05 | 1 | 1 | 0 | 10 | Q | MAG: Quiet |
| | | | | | | N04 | E20 | 0 | 0 | 0 | 10 | Q | PRO: Quiet |
| | | | | | | S18 | E21 | 0 | 0 | 0 | 10 | Q | |
| | | | | | | N21 | E30 | 1 | 0 | 0 | 10 | E | |
| | | | | | | S24 | E12 | 0 | 0 | 0 | 10 | Q | |
| | | | | | | N20 | W88 | 5 | 0 | 0 | 10 | E | |
| | | | | | | N11 | W62 | 1 | 0 | 0 | 10 | Q | |
| | | | | | | N14 | E16 | 0 | 0 | 0 | 10 | Q | |
| | | | | | | S28 | E46 | 2 | 0 | 0 | 10 | Q | |
| | | | | | | N22 | E53 | 10 | 1 | 0 | 10 | Q | |
| 131 | 11 | 10 | 174 | 170 | 4 | N16 | W74 | 0 | 0 | 0 | 11 | Q | SOL: Active |
| | | | | | | N21 | W63 | 0 | 0 | 0 | 11 | Q | MAG: Quiet |
| | | | | | | N04 | E05 | 0 | 0 | 0 | 11 | Q | PRO: Quiet |
| | | | | | | S18 | E08 | 0 | 0 | 0 | 11 | Q | |
| | | | | | | N21 | E16 | 0 | 0 | 0 | 11 | E | |
| | | | | | | S24 | E00 | 0 | 0 | 0 | 11 | E | |
| | | | | | | N11 | W76 | 0 | 0 | 0 | 11 | Q | |
| | | | | | | N13 | E03 | 1 | 1 | 0 | 11 | Q | |
| | | | | | | S27 | E33 | 1 | 0 | 0 | 11 | Q | |
| | | | | | | N22 | E38 | 6 | 0 | 0 | 11 | E | |
| 132 | 12 | 11 | 191 | 159 | 2 | N15 | W90 | 0 | 0 | 0 | 12 | Q | SOL: Active |
| | | | | | | N12 | W63 | 0 | 0 | 0 | 12 | Q | MAG: Quiet |
| | | | | | | N03 | W05 | 0 | 0 | 0 | 12 | Q | PRO: Quiet |
| | | | | | | S18 | W06 | 0 | 0 | 0 | 12 | Q | |
| | | | | | | N21 | E06 | 2 | 0 | 0 | 12 | E | |
| | | | | | | S24 | W14 | 0 | 0 | 0 | 12 | Q | |
| | | | | | | N10 | W88 | 0 | 0 | 0 | 12 | Q | |
| | | | | | | N13 | W12 | 0 | 0 | 0 | 12 | Q | |
| | | | | | | S26 | E19 | 2 | 0 | 0 | 12 | Q | |
| | | | | | | N22 | E25 | 6 | 0 | 0 | 12 | E | |
| 133 | 13 | 12 | 141 | 153 | 7 | N20 | W45 | 0 | 0 | 0 | 13 | Q | SOL: Eruptive |
| | | | | | | S18 | W19 | 1 | 0 | 0 | 13 | Q | MAG: Active |
| | | | | | | N22 | W09 | 0 | 0 | 0 | 13 | Q | PRO: Quiet |
| | | | | | | S24 | W27 | 0 | 0 | 0 | 13 | Q | |
| | | | | | | S27 | E08 | 0 | 0 | 0 | 13 | Q | |
| | | | | | | N21 | E13 | 0 | 0 | 0 | 13 | E | |
| | | | | | | S19 | E58 | 0 | 0 | 0 | 13 | Q | |
| 134 | 14 | 13 | 118 | 147 | 22 | S17 | W33 | 1 | 0 | 0 | 14 | Q | SOL: Eruptive |
| | | | | | | N22 | W23 | 0 | 0 | 0 | 14 | Q | MAG: Active |
| | | | | | | S23 | W41 | 0 | 0 | 0 | 14 | Q | PRO: Quiet |
| | | | | | | S27 | W05 | 0 | 0 | 0 | 14 | Q | |
| | | | | | | N21 | W01 | 2 | 0 | 0 | 14 | Q | |
| | | | | | | S19 | E44 | 0 | 0 | 0 | 14 | Q | |
| | | | | | | N06 | E45 | 1 | 0 | 0 | 14 | Q | |
| 135 | 15 | 14 | 126 | 144 | 10 | N20 | W74 | 0 | 0 | 0 | 15 | Q | SOL: Eruptive |
| | | | | | | S17 | W47 | 1 | 0 | 0 | 15 | Q | MAG: Quiet |
| | | | | | | N21 | W36 | 0 | 0 | 0 | 15 | Q | PRO: Quiet |

# A L E R T  P E R I O D S
## The International Space Environment Service

MAY 1999

| Julian Day | Date of Issue | Date of Obs | Wolf No. | 10-cm Solar Flux | A-index | Location Lat | Location Long | Flares Optical | Flares M | Flares X | Date of Forecast | Region Forecast(1) | Geoadvice(1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | S25 | W22 | 1 | 0 | 0 | 15 | Q | |
| | | | | | | N21 | W14 | 0 | 0 | 0 | 15 | Q | |
| | | | | | | S19 | E32 | 0 | 0 | 0 | 15 | Q | |
| | | | | | | S20 | E60 | 2 | 0 | 0 | 15 | Q | |
| | | | | | | N37 | E71 | 0 | 0 | 0 | 15 | Q | |
| 136 | 16 | 15 | 167 | 144 | 5 | S17 | W60 | 0 | 0 | 0 | 16 | Q | SOL: Eruptive |
| | | | | | | N22 | W49 | 0 | 0 | 0 | 16 | Q | MAG: Quiet |
| | | | | | | S25 | W33 | 0 | 0 | 0 | 16 | Q | PRO: Quiet |
| | | | | | | N21 | W26 | 3 | 0 | 0 | 16 | Q | |
| | | | | | | S19 | E18 | 0 | 0 | 0 | 16 | Q | |
| | | | | | | N06 | E16 | 0 | 0 | 0 | 16 | Q | |
| | | | | | | S21 | E48 | 8 | 0 | 0 | 16 | E | |
| | | | | | | N36 | E62 | 0 | 0 | 0 | 16 | Q | |
| | | | | | | S33 | W45 | 0 | 0 | 0 | 16 | Q | |
| | | | | | | N22 | W15 | 0 | 0 | 0 | 16 | Q | |
| 137 | 17 | 16 | 151 | 152 | 4 | S16 | W77 | 4 | 2 | 0 | 17 | Q | SOL: Eruptive |
| | | | | | | N22 | W62 | 0 | 0 | 0 | 17 | Q | MAG: Quiet |
| | | | | | | S31 | W38 | 1 | 0 | 0 | 17 | Q | PRO: Quiet |
| | | | | | | N20 | W39 | 0 | 1 | 0 | 17 | Q | |
| | | | | | | S19 | E06 | 0 | 0 | 0 | 17 | Q | |
| | | | | | | N06 | E03 | 0 | 0 | 0 | 17 | Q | |
| | | | | | | S20 | E34 | 0 | 0 | 0 | 17 | Q | |
| | | | | | | N37 | E49 | 0 | 0 | 0 | 17 | Q | |
| | | | | | | S34 | W61 | 0 | 0 | 0 | 17 | Q | |
| | | | | | | N21 | W30 | 0 | 0 | 0 | 17 | Q | |
| 138 | 18 | 17 | 148 | 145 | 2 | S22 | W85 | 3 | 0 | 0 | 18 | Q | SOL: Active |
| | | | | | | N22 | W76 | 0 | 0 | 0 | 18 | Q | MAG: Quiet |
| | | | | | | N21 | W53 | 3 | 0 | 0 | 18 | Q | PRO: Quiet |
| | | | | | | S19 | W06 | 0 | 0 | 0 | 18 | Q | |
| | | | | | | N06 | W11 | 0 | 0 | 0 | 18 | Q | |
| | | | | | | S20 | E20 | 0 | 0 | 0 | 18 | Q | |
| | | | | | | N36 | E38 | 1 | 0 | 0 | 18 | Q | |
| | | | | | | S32 | W73 | 0 | 0 | 0 | 18 | Q | |
| | | | | | | N22 | W42 | 0 | 0 | 0 | 18 | Q | |
| | | | | | | S21 | E48 | 0 | 0 | 0 | 18 | Q | |
| 139 | 19 | 18 | 129 | 141 | 22 | N22 | W88 | 0 | 0 | 0 | 19 | Q | SOL: Active |
| | | | | | | N20 | W65 | 2 | 0 | 0 | 19 | Q | MAG: Active |
| | | | | | | S19 | W20 | 0 | 0 | 0 | 19 | Q | PRO: Quiet |
| | | | | | | S20 | E06 | 0 | 0 | 0 | 19 | Q | |
| | | | | | | N37 | E25 | 2 | 0 | 0 | 19 | Q | |
| | | | | | | S32 | W86 | 0 | 0 | 0 | 19 | Q | |
| | | | | | | N24 | W53 | 0 | 0 | 0 | 19 | Q | |
| | | | | | | S21 | E35 | 0 | 0 | 0 | 19 | Q | |
| 140 | 20 | 19 | 120 | 142 | 11 | S29 | W76 | 0 | 0 | 0 | 20 | Q | SOL: Eruptive |
| | | | | | | N21 | W78 | 1 | 0 | 0 | 20 | Q | MAG: Quiet |
| | | | | | | S18 | W32 | 0 | 0 | 0 | 20 | Q | PRO: Quiet |
| | | | | | | S19 | W07 | 0 | 0 | 0 | 20 | Q | |
| | | | | | | N38 | E13 | 0 | 0 | 0 | 20 | Q | |
| | | | | | | N24 | W69 | 0 | 0 | 0 | 20 | Q | |
| | | | | | | S19 | E23 | 0 | 0 | 0 | 20 | Q | |
| 141 | 21 | 20 | 121 | 143 | 10 | S18 | W45 | 0 | 0 | 0 | 21 | Q | SOL: Eruptive |
| | | | | | | S20 | W20 | 0 | 0 | 0 | 21 | Q | MAG: Quiet |
| | | | | | | N36 | E01 | 1 | 0 | 0 | 21 | Q | PRO: Quiet |
| | | | | | | S20 | E08 | 0 | 0 | 0 | 21 | Q | |
| | | | | | | N24 | W63 | 10 | 0 | 0 | 21 | Q | |
| | | | | | | S14 | E70 | 0 | 0 | 0 | 21 | Q | |
| 142 | 22 | 21 | 128 | 140 | 7 | S18 | W59 | 0 | 0 | 0 | 22 | Q | SOL: Eruptive |
| | | | | | | S19 | W35 | 0 | 0 | 0 | 22 | Q | MAG: Quiet |
| | | | | | | N36 | W10 | 0 | 0 | 0 | 22 | E | PRO: Quiet |
| | | | | | | S20 | W06 | 0 | 0 | 0 | 22 | Q | |

# A L E R T  P E R I O D S
## The International Space Environment Service

### MAY 1999

| Julian Day | Date of Issue | Date of Obs | Wolf No. | 10-cm Solar Flux | A-index | Location | | Flares | | | Date of Forecast | Region Forecast(1) | Geoadvice(1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Lat | Long | Optical | M | X | | | |
| | | | | | | N26 | W79 | 8 | 0 | 0 | 22 | E | |
| | | | | | | S14 | E55 | 1 | 0 | 0 | 22 | Q | |
| | | | | | | N32 | E62 | 0 | 0 | 0 | 22 | Q | |
| 143 | 23 | 22 | 121 | 140 | 4 | S20 | W72 | 0 | 0 | 0 | 23 | Q | SOL: Eruptive |
| | | | | | | S21 | W47 | 0 | 0 | 0 | 23 | Q | MAG: Quiet |
| | | | | | | N36 | W24 | 1 | 0 | 0 | 23 | E | PRO: Quiet |
| | | | | | | S19 | W19 | 0 | 0 | 0 | 23 | Q | |
| | | | | | | N25 | W85 | 0 | 0 | 0 | 23 | E | |
| | | | | | | S14 | E43 | 1 | 0 | 0 | 23 | E | |
| | | | | | | N33 | E50 | 0 | 0 | 0 | 23 | Q | |
| 144 | 24 | 23 | 104 | 141 | 12 | S20 | W85 | 0 | 0 | 0 | 24 | Q | SOL: Eruptive |
| | | | | | | S22 | W59 | 0 | 0 | 0 | 24 | Q | MAG: Quiet |
| | | | | | | N35 | W36 | 3 | 0 | 0 | 24 | E | PRO: Quiet |
| | | | | | | S20 | W30 | 0 | 0 | 0 | 24 | Q | |
| | | | | | | S13 | E30 | 1 | 0 | 0 | 24 | E | |
| | | | | | | N32 | E36 | 2 | 0 | 0 | 24 | E | |
| 145 | 25 | 24 | 104 | 137 | 14 | S20 | W72 | 0 | 0 | 0 | 25 | Q | SOL: Eruptive |
| | | | | | | N36 | W49 | 0 | 0 | 0 | 25 | E | MAG: Quiet |
| | | | | | | S20 | W47 | 0 | 0 | 0 | 25 | Q | PRO: Quiet |
| | | | | | | S14 | E17 | 3 | 0 | 0 | 25 | E | |
| | | | | | | N32 | E25 | 3 | 0 | 0 | 25 | E | |
| | | | | | | N20 | E68 | 4 | 0 | 0 | 25 | E | |
| 146 | 26 | 25 | 130 | 143 | 16 | S22 | W80 | 0 | 0 | 0 | 26 | Q | SOL: Eruptive |
| | | | | | | N37 | W61 | 5 | 0 | 0 | 26 | E | MAG: Quiet |
| | | | | | | S20 | W61 | 2 | 0 | 0 | 26 | Q | PRO: Quiet |
| | | | | | | S14 | E02 | 4 | 0 | 0 | 26 | E | |
| | | | | | | N32 | E10 | 0 | 0 | 0 | 26 | E | |
| | | | | | | N20 | E54 | 3 | 0 | 0 | 26 | E | |
| | | | | | | N25 | W02 | 0 | 0 | 0 | 26 | Q | |
| | | | | | | N27 | E39 | 0 | 0 | 0 | 26 | Q | |
| 147 | 27 | 26 | 152 | 153 | 7 | S22 | W93 | 1 | 0 | 0 | 27 | Q | SOL: Eruptive |
| | | | | | | N37 | W70 | 3 | 0 | 0 | 27 | E | MAG: Quiet |
| | | | | | | S21 | W71 | 0 | 0 | 0 | 27 | Q | PRO: Quiet |
| | | | | | | S14 | W12 | 2 | 0 | 0 | 27 | E | |
| | | | | | | N31 | W02 | 1 | 0 | 0 | 27 | Q | |
| | | | | | | N11 | E41 | 6 | 1 | 0 | 27 | E | |
| | | | | | | N29 | W08 | 0 | 0 | 0 | 27 | Q | |
| | | | | | | N26 | E26 | 3 | 0 | 0 | 27 | Q | |
| | | | | | | N16 | E75 | 0 | 0 | 0 | 27 | Q | |
| 148 | 28 | 27 | 154 | 155 | 10 | N37 | W85 | 1 | 0 | 0 | 28 | E | SOL: Eruptive |
| | | | | | | S21 | W83 | 2 | 0 | 0 | 28 | Q | MAG: Quiet |
| | | | | | | S15 | W30 | 0 | 0 | 0 | 28 | Q | PRO: Quiet |
| | | | | | | N32 | W14 | 1 | 0 | 0 | 28 | Q | |
| | | | | | | N20 | E25 | 8 | 0 | 0 | 28 | E | |
| | | | | | | N26 | E11 | 4 | 0 | 0 | 28 | Q | |
| | | | | | | N15 | E61 | 0 | 0 | 0 | 28 | Q | |
| | | | | | | S14 | E08 | 0 | 0 | 0 | 28 | Q | |
| | | | | | | S28 | E73 | 2 | 0 | 0 | 28 | Q | |
| 149 | 29 | 28 | 146 | 152 | 10 | S15 | W45 | 0 | 0 | 0 | 29 | Q | SOL: Active |
| | | | | | | N32 | W25 | 0 | 0 | 0 | 29 | E | MAG: Active |
| | | | | | | N21 | E06 | 0 | 0 | 0 | 29 | E | PRO: Quiet |
| | | | | | | N27 | W02 | 1 | 0 | 0 | 29 | E | |
| | | | | | | N17 | E49 | 0 | 0 | 0 | 29 | Q | |
| | | | | | | S14 | W06 | 0 | 0 | 0 | 29 | Q | |
| | | | | | | S29 | E56 | 4 | 0 | 0 | 29 | E | |
| | | | | | | N14 | E68 | 1 | 0 | 0 | 29 | Q | |
| | | | | | | N21 | E13 | 0 | 0 | 0 | 29 | Q | |
| | | | | | | S25 | E61 | 0 | 0 | 0 | 29 | Q | |
| 150 | 30 | 29 | 151 | 149 | 5 | S15 | W57 | 0 | 0 | 0 | 30 | Q | SOL: Eruptive |

# A L E R T  P E R I O D S
## The International Space Environment Service

### MAY 1999

| Julian Day | Date of Issue | Date of Obs | Wolf No. | 10-cm Solar Flux | A-index | Location Lat | Location Long | Flares Optical | Flares M | Flares X | Date of Forecast | Region Forecast(1) | Geoadvice(1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | N31 | W37 | 0 | 0 | 0 | 30 | Q | MAG: Quiet |
| | | | | | | N18 | W06 | 1 | 0 | 0 | 30 | E | PRO: Quiet |
| | | | | | | N24 | W14 | 3 | 0 | 0 | 30 | Q | |
| | | | | | | N17 | E35 | 0 | 0 | 0 | 30 | Q | |
| | | | | | | S30 | E46 | 1 | 0 | 0 | 30 | Q | |
| | | | | | | N16 | E56 | 1 | 0 | 0 | 30 | Q | |
| | | | | | | N20 | E03 | 1 | 0 | 0 | 30 | Q | |
| | | | | | | S23 | E50 | 1 | 0 | 0 | 30 | Q | |
| | | | | | | N22 | E11 | 0 | 0 | 0 | 30 | Q | |
| 151 | 31 | 30 | 169 | 157 | 3 | S15 | W72 | 0 | 0 | 0 | 31 | Q | SOL: Eruptive |
| | | | | | | N30 | W49 | 1 | 0 | 0 | 31 | Q | MAG: Quiet |
| | | | | | | N19 | W18 | 1 | 0 | 0 | 31 | E | PRO: Quiet |
| | | | | | | N24 | W27 | 0 | 0 | 0 | 31 | Q | |
| | | | | | | N16 | E22 | 0 | 0 | 0 | 31 | Q | |
| | | | | | | S30 | E34 | 0 | 0 | 0 | 31 | Q | |
| | | | | | | N16 | E43 | 6 | 0 | 0 | 31 | E | |
| | | | | | | N21 | W08 | 0 | 0 | 0 | 31 | Q | |
| | | | | | | S24 | E35 | 0 | 0 | 0 | 31 | Q | |
| | | | | | | N25 | E06 | 0 | 0 | 0 | 31 | Q | |

(1) Region Forecast and Flare (SOL) Advice
- Q = Quiet (<50% probability of C-class flares)
- E = Eruptive (C-class flares expected, probability >=50%)
- A = Active (M-class flares expected, probability >=50%)
- M = Major (X-class flares expected, probability >=50%)
- P = Proton (Proton flares expected, probability >=50%)
- W = Warning (activity levels are expected to increase, but no numerical forecast given)
- / = No forecast available

Magnetic (MAG) Geoadvice

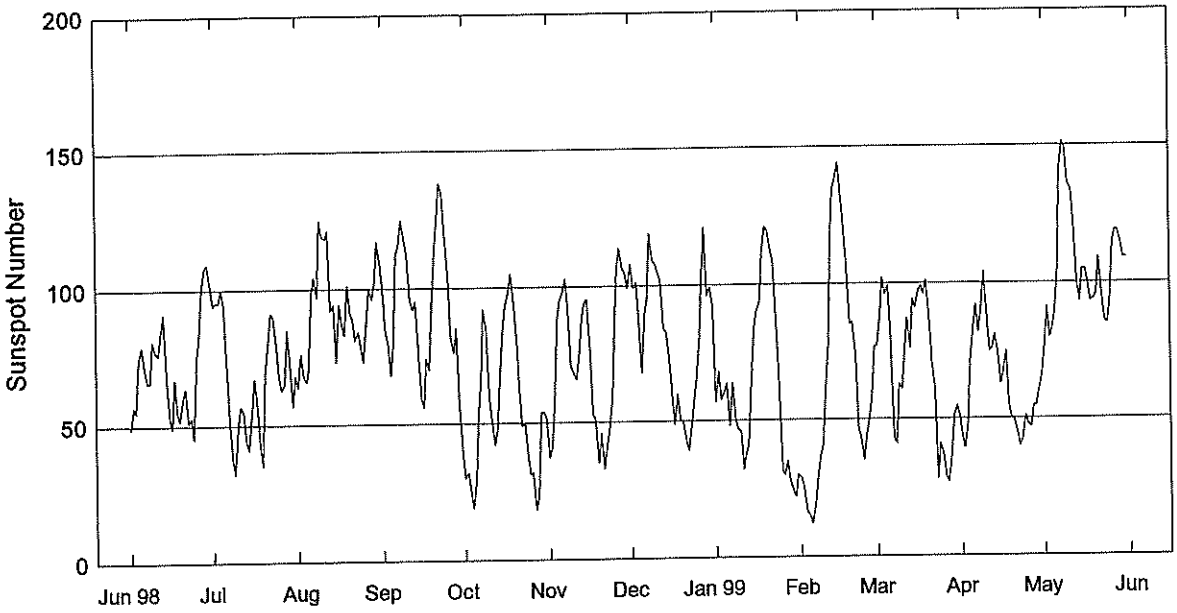
| | | |
|---|---|---|
| 'Quiet' | | |
| 'Active' | conditions expected | (A>=20 or K=4) |
| 'Minor' | storm expected | (A>=30 or K=5) |
| 'Major' | storm expected | (A>=50 or K>=6) |
| 'Severe' | storm expected | (A>=100 or K>=7) |
| 'IP' | magstorm in progress | (A>=30 or K>=4) |
| 'Warning' | (activity levels are expected to increase, but no numerical forecast given) | |
| '/' | no forecast available | |

Proton (PRO) Geoadvice

| | | |
|---|---|---|
| 'Quiet' | | |
| 'Proton' | event expected | (10pfu at >10MeV) |
| 'Major' | proton event expected | (100pfu at >100 MeV) |
| 'IP' | proton event in progress | (>10 MeV) |
| 'Warning' | (activity levels are expected to increase, but no numerical forecast given) | |
| '/' | no forecast available | |

STRATWARM ALERTS - NONE

# International Relative Sunspot Numbers
## Jun 1998 - May 1999

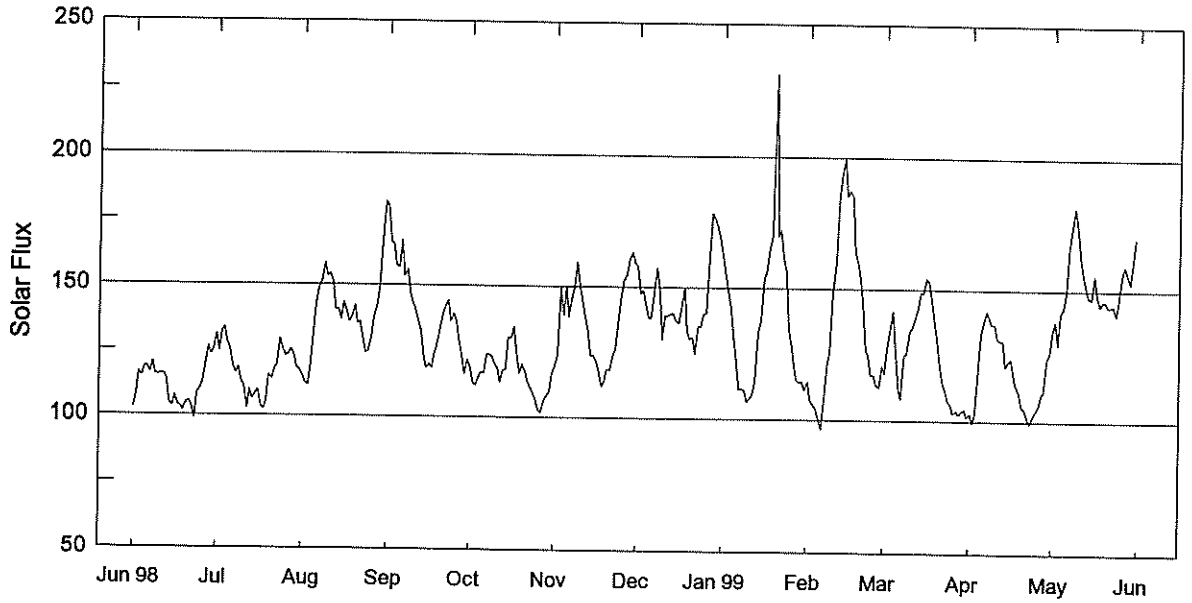



| Day | Jun 98 | Jul | Aug | Sep | Oct | Nov | Dec | Jan 99* | Feb* | Mar* | Apr* | May* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 49 | 94 | 64 | 100 | 30 | 37 | 108 | 57 | 29 | 77 | 44 | 75 |
| 2 | 57 | 95 | 76 | 85 | 32 | 41 | 99 | 68 | 25 | 88 | 39 | 91 |
| 3 | 55 | 95 | 68 | 79 | 25 | 56 | 101 | 58 | 16 | 102 | 48 | 80 |
| 4 | 74 | 100 | 66 | 68 | 19 | 88 | 86 | 60 | 15 | 96 | 71 | 83 |
| 5 | 79 | 94 | 70 | 80 | 30 | 95 | 68 | 64 | 12 | 99 | 81 | 89 |
| 6 | 72 | 74 | 98 | 112 | 54 | 98 | 89 | 48 | 19 | 79 | 92 | 105 |
| 7 | 66 | 51 | 104 | 116 | 66 | 103 | 95 | 64 | 28 | 43 | 82 | 141 |
| 8 | 66 | 38 | 97 | 125 | 92 | 92 | 119 | 51 | 36 | 41 | 89 | 151 |
| 9 | 81 | 32 | 125 | 119 | 84 | 71 | 109 | 47 | 41 | 63 | 104 | 149 |
| 10 | 77 | 49 | 119 | 112 | 60 | 68 | 108 | 46 | 60 | 61 | 90 | 136 |
| 11 | 76 | 57 | 118 | 96 | 51 | 66 | 105 | 32 | 78 | 76 | 75 | 134 |
| 12 | 83 | 55 | 121 | 92 | 42 | 73 | 102 | 38 | 115 | 87 | 76 | 122 |
| 13 | 91 | 44 | 92 | 95 | 48 | 88 | 84 | 41 | 134 | 76 | 81 | 101 |
| 14 | 69 | 41 | 94 | 78 | 66 | 94 | 83 | 65 | 138 | 94 | 74 | 93 |
| 15 | 53 | 55 | 73 | 60 | 84 | 95 | 72 | 83 | 144 | 91 | 63 | 105 |
| 16 | 49 | 67 | 94 | 56 | 93 | 76 | 60 | 90 | 133 | 97 | 67 | 105 |
| 17 | 67 | 59 | 87 | 74 | 98 | 53 | 49 | 93 | 122 | 99 | 75 | 99 |
| 18 | 55 | 42 | 83 | 70 | 105 | 51 | 60 | 111 | 105 | 96 | 55 | 93 |
| 19 | 52 | 35 | 101 | 93 | 96 | 35 | 50 | 121 | 85 | 101 | 50 | 94 |
| 20 | 60 | 69 | 91 | 114 | 81 | 46 | 50 | 120 | 86 | 88 | 50 | 96 |
| 21 | 64 | 78 | 89 | 125 | 63 | 33 | 43 | 114 | 74 | 71 | 45 | 109 |
| 22 | 51 | 91 | 81 | 138 | 49 | 41 | 39 | 108 | 47 | 61 | 40 | 97 |
| 23 | 53 | 90 | 84 | 135 | 50 | 47 | 47 | 87 | 42 | 28 | 42 | 86 |
| 24 | 45 | 79 | 79 | 117 | 39 | 59 | 58 | 68 | 35 | 41 | 51 | 85 |
| 25 | 75 | 68 | 73 | 105 | 31 | 85 | 66 | 31 | 44 | 37 | 48 | 92 |
| 26 | 83 | 63 | 87 | 82 | 32 | 106 | 81 | 30 | 51 | 29 | 47 | 114 |
| 27 | 100 | 65 | 100 | 76 | 18 | 114 | 100 | 35 | 59 | 27 | 55 | 119 |
| 28 | 108 | 85 | 96 | 85 | 23 | 106 | 121 | 28 | 77 | 37 | 55 | 119 |
| 29 | 109 | 74 | 102 | 60 | 54 | 105 | 96 | 24 |  | 51 | 61 | 115 |
| 30 | 101 | 57 | 117 | 41 | 54 | 99 | 99 | 22 |  | 55 | 66 | 109 |
| 31 |  | 68 | 109 |  | 52 |  | 92 | 30 |  | 51 |  | 109 |
| Mean | 70.7 | 66.6 | 92.2 | 92.9 | 55.5 | 74.0 | 81.9 | 62.4 | 66.1 | 69.1 | 63.9 | 106.3 |

* = Provisional.

# Penticton 2800 MHz (10.7cm) Solar Flux
## Jun 98 - May 99

Adjusted to 1 AU




| Day | Jun 98 | Jul | Aug | Sep | Oct | Nov | Dec | Jan 99 | Feb | Mar | Apr | May |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 103.0 | 131.1 | 115.4 | 180.2 | 119.1 | 119.5 | 158.2 | 161.6 | 114.5 | 118.0 | 102.9 | 134.9* |
| 2 | 107.7 | 124.4 | 112.9 | 166.3 | 112.9 | 124.1 | 147.4 | 154.8 | 107.7 | 127.6 | 99.4 | 137.9 |
| 3 | 116.4 | 131.9 | 111.7 | 165.5 | 112.0 | 149.3 | 148.7 | 149.4 | 105.8 | 134.6 | 102.7 | 129.2 |
| 4 | 115.0 | 133.5 | 119.2 | 157.3 | 114.9 | 139.0 | 144.0 | 142.0 | 104.3 | 141.6 | 116.0 | 141.1 |
| 5 | 118.4 | 127.6 | 130.5 | 156.8 | 117.1 | 150.1 | 138.3 | 132.0 | 100.9 | 125.4 | 132.7 | 143.3 |
| 6 | 118.5 | 125.2 | 142.2 | 167.1 | 116.9 | 138.4 | 138.1 | 121.6 | 96.6 | 112.6 | 137.6 | 149.5 |
| 7 | 116.4 | 118.5 | 149.1 | 153.5 | 124.1 | 145.8 | 148.7 | 111.3 | 106.5 | 108.3 | 141.7 | 166.4 |
| 8 | 120.5 | 116.2 | 150.9 | 155.8 | 123.8 | 149.9 | 157.1 | 111.7 | 121.1 | 125.0 | 139.5 | 175.1 |
| 9 | 115.7 | 118.2 | 158.3 | 147.4 | 123.2 | 159.3 | 149.3 | 111.0 | 125.9 | 125.3 | 136.7 | 181.7 |
| 10 | 115.3 | 112.9 | 153.3 | 143.6 | 120.3 | 150.8 | 129.8 | 106.7 | 148.4 | 133.6 | 136.9 | 172.8 |
| 11 | 115.8 | 111.3 | 154.1 | 140.4 | 118.5 | 144.1 | 138.8 | 108.2 | 159.3 | 135.3 | 131.3 | 162.6 |
| 12 | 115.7 | 102.6 | 150.9 | 136.6 | 113.4 | 138.7 | 138.9 | 109.1 | 183.6 | 138.5 | 130.7 | 156.3 |
| 13 | 113.9 | 109.7 | 140.4 | 132.3 | 117.5 | 132.6 | 139.7 | 114.7 | 193.4 | 142.7 | 130.3 | 150.5 |
| 14 | 105.1 | 106.3 | 140.6 | 123.3 | 118.4 | 123.8 | 139.9 | 132.4 | 199.6 | 148.7 | 121.0 | 147.3 |
| 15 | 103.6 | 108.2 | 136.8 | 118.6 | 130.4 | 123.7 | 137.2 | 138.0 | 185.5 | 148.4 | 122.7 | 146.8 |
| 16 | 107.3 | 109.7 | 143.3 | 119.9 | 130.1 | 121.8 | 136.1 | 153.4 | 187.3 | 154.1 | 123.8 | 155.6 |
| 17 | 103.9 | 103.6 | 139.7 | 118.6 | 134.4 | 118.0 | 141.5 | 156.2 | 185.3 | 152.9 | 116.6 | 148.6 |
| 18 | 103.3 | 102.4 | 135.8 | 123.7 | 125.0 | 112.2 | 149.8 | 165.4 | 164.2 | 146.7 | 113.8 | 143.8 |
| 19 | 101.8 | 105.2 | 137.9 | 128.0 | 116.8 | 113.7 | 133.6 | 170.3 | 160.5 | 138.1 | 110.9 | 145.8 |
| 20 | 104.4 | 115.4 | 141.9 | 133.3 | 120.2 | 118.6 | 130.4 | 231.3 | 153.6 | 131.6 | 105.8 | 145.9 |
| 21 | 105.4 | 113.9 | 135.2 | 139.4 | 117.2 | 118.3 | 130.9 | 169.7 | 144.0 | 123.1 | 104.4 | 143.7 |
| 22 | 103.8 | 117.8 | 135.9 | 142.1 | 113.8 | 123.0 | 124.6 | 172.3 | 127.0 | 115.0 | 101.4 | 143.7 |
| 23 | 98.9 | 119.1 | 129.3 | 144.1 | 111.4 | 126.7 | 135.2 | 160.8 | 124.3 | 112.2 | 99.3 | 144.2 |
| 24 | 108.8 | 129.2 | 123.9 | 136.2 | 109.6 | 136.7 | 134.9 | 156.8 | 117.3 | 107.6 | 102.0 | 140.4 |
| 25 | 109.7 | 125.5 | 124.8 | 139.2 | 106.3 | 145.6 | 139.6 | 133.9 | 117.1 | 106.4 | 103.8 | 146.8 |
| 26 | 112.8 | 122.8 | 129.6 | 136.2 | 102.8 | 152.3 | 140.2 | 129.1 | 113.4 | 103.1 | 105.8 | 156.6 |
| 27 | 119.1 | 123.2 | 137.8 | 128.0 | 101.8 | 154.7 | 161.4 | 121.6 | 112.9 | 104.1 | 110.0 | 159.3 |
| 28 | 126.1 | 125.1 | 142.0 | 123.0 | 106.4 | 160.4 | 178.3 | 115.2 | 120.7 | 102.7 | 111.3 | 156.2 |
| 29 | 123.3 | 123.1 | 149.4 | 116.3 | 108.0 | 163.2 | 176.8 | 114.2 | | 103.8 | 123.9 | 152.7 |
| 30 | 125.0 | 118.3 | 166.4 | 121.8 | 109.9 | 158.9 | 173.1 | 114.5 | | 104.4 | 125.3 | 161.1 |
| 31 | | 117.2 | 181.8 | | 117.0 | | 168.8 | 111.5 | | 101.7 | | 170.1 |
| Mean | 111.8 | 117.7 | 139.4 | 139.8 | 116.6 | 137.1 | 145.5 | 138.1 | 138.6 | 124.9 | 118.0 | 151.9 |

NOTE: * 2300UT reading - hail on antenna at 2000UT.

# DAILY SOLAR INDICES

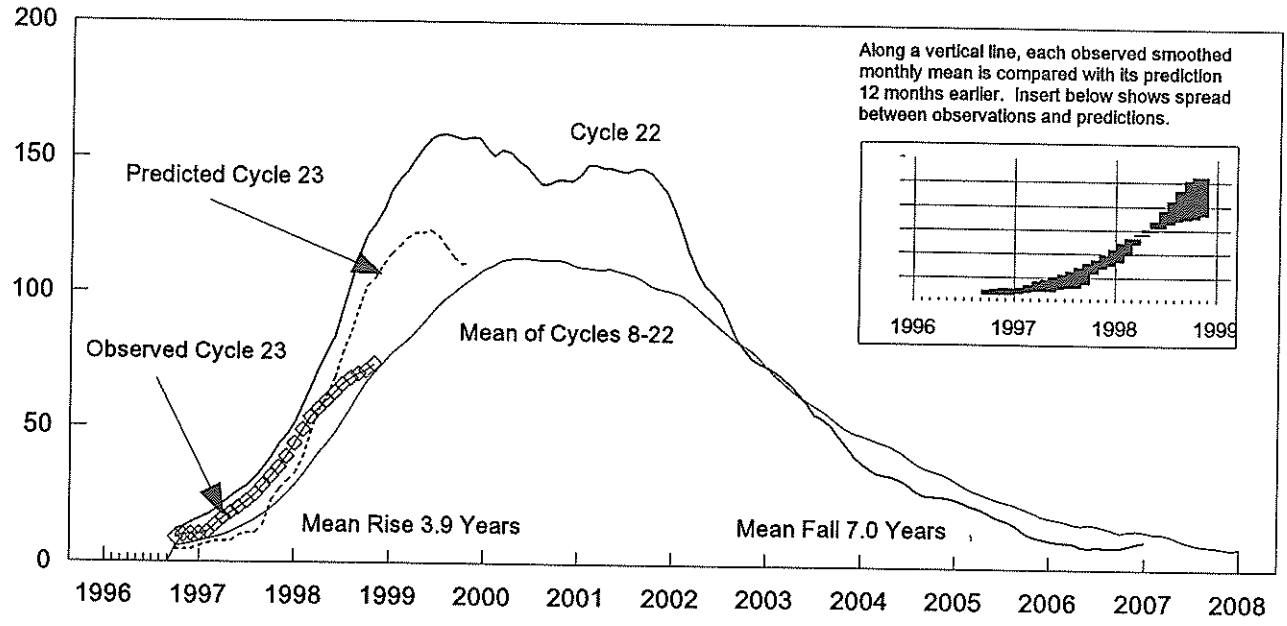
May 1999

| Day | Day of Year | Bartels Cycle Day | Sunspot Numbers Int | Sunspot Numbers Amer | Obs Flux Penticton (2800) | Solar Flux Adjusted to 1 Astronomical Unit — SGMR (15400) | SGMR (8800) | SGMR (4995) | Pentic (2800) | SGMR (2695) | SGMR (1415) | SGMR (610) | SGMR (410) | SGMR (245) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 121 | 5 | 75 | 77 | 132.9* | 512 | 253 | 155 | 134.9* | 122 | 93 | 49 | 35 | 16 |
| 2 | 122 | 6 | 91 | 87 | 135.7 | 518 | 253 | 158 | 137.9 | 136 | 108 | 57 | 39 | 18 |
| 3 | 123 | 7 | 80 | 75 | 127.1 | 511 | 268 | 177 | 129.2 | 126 | 104 | 58 | 41 | 18 |
| 4 | 124 | 8 | 83 | 67 | 138.7 | 459 | 234 | 162 | 141.1 | 130 | 106 | 56 | 42 | 41 |
| 5 | 125 | 9 | 89 | 75 | 140.9 | 469 | 250 | 168 | 143.3 | 136 | 112 | 57 | 47 | 24 |
| 6 | 126 | 10 | 105 | 93 | 146.9 | 488 | 275 | 185 | 149.5 | 139 | 117 | 59 | 45 | 25 |
| 7 | 127 | 11 | 141 | 130 | 163.4 | 519 | 302 | 213 | 166.4 | 155 | 127 | 66 | 44 | 21 |
| 8 | 128 | 12 | 151 | 151 | 171.9 | 530 | 312 | 233 | 175.1 | 168 | 134 | 68 | 63 | 36 |
| 9 | 129 | 13 | 149 | 149 | 178.3 | 538 | 302 | 216 | 181.7 | 175 | 141 | 63 | 58 | 48 |
| 10 | 130 | 14 | 136 | 119 | 169.5 | 531 | 276 | 189 | 172.8 | 164 | 132 | 63 | 45 | -- |
| 11 | 131 | 15 | 134 | 116 | 159.4 | 527 | 279 | 186 | 162.6 | 157 | 127 | 64 | 44 | 20 |
| 12 | 132 | 16 | 122 | 117 | 153.1 | 527 | 274 | 180 | 156.3 | 149 | 123 | 66 | 49 | 51 |
| 13 | 133 | 17 | 101 | 97 | 147.3 | 521 | 274 | 191 | 150.5 | 145 | 118 | 65 | 51 | 63 |
| 14 | 134 | 18 | 93 | 88 | 144.2 | 520 | 275 | 192 | 147.3 | 145 | 117 | 62 | 53 | 66 |
| 15 | 135 | 19 | 105 | 108 | 143.6 | 521 | 272 | 177 | 146.8 | 141 | 112 | 56 | 40 | 24 |
| 16 | 136 | 20 | 105 | 106 | 152.2 | 530 | 281 | 186 | 155.6 | 150 | 114 | 60 | 47 | 40 |
| 17 | 137 | 21 | 99 | 98 | 145.3 | 536 | 293 | 183 | 148.6 | 145 | 110 | 58 | 43 | 35 |
| 18 | 138 | 22 | 93 | 91 | 140.6 | 523 | 279 | 176 | 143.8 | 137 | 107 | 61 | 49 | 54 |
| 19 | 139 | 23 | 94 | 99 | 142.4 | 494 | 275 | 191 | 145.8 | 139 | 106 | 61 | 46 | 30 |
| 20 | 140 | 24 | 96 | 100 | 142.5 | 511 | 282 | 184 | 145.9 | 139 | 113 | -- | -- | -- |
| 21 | 141 | 25 | 109 | 104 | 140.3 | 518 | 275 | 171 | 143.7 | 132 | 103 | 57 | 42 | 62 |
| 22 | 142 | 26 | 97 | 97 | 140.2 | 511 | 276 | 171 | 143.7 | 134 | 104 | 54 | 40 | 22 |
| 23 | 143 | 27 | 86 | 93 | 140.7 | 518 | 280 | 172 | 144.2 | 136 | 107 | 54 | 42 | 30 |
| 24 | 144 | 1 | 85 | 87 | 136.9 | 497 | 287 | 180 | 140.4 | 138 | 106 | 58 | 44 | 31 |
| 25 | 145 | 2 | 92 | 87 | 143.1 | 526 | 284 | 180 | 146.8 | 147 | 110 | -- | -- | -- |
| 26 | 146 | 3 | 114 | 100 | 152.6 | 508 | 290 | 186 | 156.6 | 146 | 114 | 59 | 40 | 21 |
| 27 | 147 | 4 | 119 | 108 | 155.2 | 520 | 303 | 197 | 159.3 | 160 | 124 | 63 | 42 | 19 |
| 28 | 148 | 5 | 119 | 102 | 152.1 | 522 | 303 | 185 | 156.2 | 150 | 122 | 62 | 41 | 25 |
| 29 | 149 | 6 | 115 | 106 | 148.6 | 524 | 332 | 182 | 152.7 | 148 | 124 | 60 | 41 | 30 |
| 30 | 150 | 7 | 109 | 97 | 156.8 | 525 | 309 | 192 | 161.1 | 154 | 125 | 62 | 43 | 22 |
| 31 | 151 | 8 | 109 | 124 | 165.4 | 546 | 314 | 201 | 170.1 | 162 | 127 | 66 | 52 | -- |
| MEAN | | | 106.3 | 101.6 | 148.6 | 516 | 282 | 184 | 151.9 | 145 | 115 | 60 | 45 | 33 |

The International numbers shown above are preliminary values; the American numbers are final.

NOTE: Radio flux values are from Sagamore Hill, Masssachusetts, USA.
* 2300UT reading - hail on antenna at 2000UT

# Cycle 23 Smoothed Sunspot Numbers: Observed and Predicted




## Smoothed Sunspot Numbers (observed and Predicted) for Parts of Solar Cycles 22 and 23

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1992 | 124 | 115 | 108 | 103 | 100 | 97 | 91 | 84 | 80 | 76 | 74 | 73 | 94 |
| 1993 | 71 | 69 | 67 | 64 | 60 | 56 | 55 | 52 | 48 | 45 | 41 | 38 | 56 |
| 1994 | 37 | 35 | 34 | 34 | 33 | 31 | 29 | 27 | 27 | 27 | 26 | 26 | 31 |
| 1995 | 24 | 23 | 22 | 21 | 19 | 18 | 17 | 15 | 13 | 12 | 11 | 11 | 17 |
| 1996 | 10 | 10 | 10 | 9 | 8* | 9 | 8 | 8 | 8 | 9** | 10 | 10 | 8 |
| 1997 | 11 | 11 | 14 | 17 | 18 | 20 | 23 | 25 | 28 | 32 | 35 | 39 | 23 |
| 1998 | 44 | 49 | 53 | 57 | 59 | 63 | 65 | 68 | 69 | 71 | 73 | 77 | 62 |
| | | | | | | | | | | | | (3) | (0) |
| 1999 | 80 | 84 | 87 | 91 | 95 | 98 | 101 | 104 | 106 | 109 | 111 | 113 | 98 |
| | (6) | (7) | (7) | (8) | (10) | (12) | (16) | (21) | (25) | (29) | (31) | (33) | (17) |
| 2000 | 114 | 115 | 116 | 117 | 117 | 117 | 117 | 117 | 117 | 116 | 115 | 114 | 116 |
| | (36) | (37) | (38) | (39) | (39) | (38) | (37) | (38) | (38) | (38) | (39) | (39) | (38) |

Solar Cycle 22 | Solar Cycle 23 | Min, Max, and Predictions

*** May 1996 marks Cycle 22's mathematical minimum. ** October 1996 marks the consensus minimum NGDC is now using.**

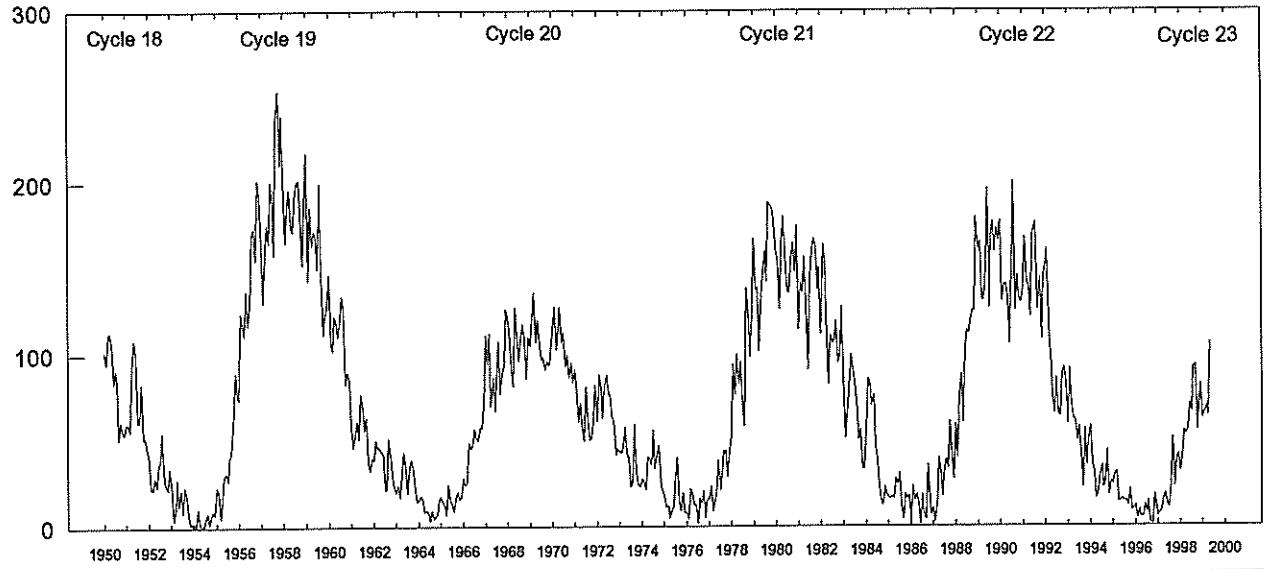
**Observed and Predicted Numbers.** For the end of Cycle 22, and the rise and decline of Cycle 23, the table above lists observed smoothed sunspot numbers up to the one that includes the most recent monthly mean. We based these smoothed values on final monthly means through Dec 1998 and on provisional numbers thereafter. Table entries with numbers in parentheses below them denote predictions by the McNish-Lincoln method. (See page 9 in the Jul 1987 supplement to *Solar-Geophysical Data.*) Adding the number in parentheses to the predicted value generates the upper limit of the 90% confidence interval. Subtracting the number from the predicted value generates the lower limit. Consider, for example, the November 1999 prediction. There exists a 90% chance that in November 1999, the actual smoothed number will fall somewhere between 80 and 142.

**Points to Ponder.** The McNish-Lincoln prediction method generates useful estimates of smoothed, monthly mean sunspot numbers for no more than 12 months ahead. Beyond 12 months, the predictions regress toward the mean of all 15 cycles of observations used in the computation. Moreover, the method remains very sensitive to the date defining the onset of the current cycle, that is, to the date of the most recent sunspot minimum. The new cycle predictions tabulated above are based on the consensus minimum value of 8.8 that occurred in October 1996.

**Note: Please visit http://www.sec.noaa.gov for solar minimum and Cycle 23 discussions.**

# Mean Monthly Sunspot Numbers
## Jan 1950 - May 1999






| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | 101.6 | 94.8 | 109.7 | 113.4 | 106.2 | 83.6 | 91.0 | 85.2 | 51.3 | 61.4 | 54.8 | 54.1 | 83.9 | |
| 1951 | 59.9 | 59.9 | 55.9 | 92.9 | 108.5 | 100.6 | 61.5 | 61.0 | 83.1 | 51.6 | 52.4 | 45.8 | 69.4 | |
| 1952 | 40.7 | 22.7 | 22.0 | 29.1 | 23.4 | 36.4 | 39.3 | 54.9 | 28.2 | 23.8 | 22.1 | 34.3 | 31.5 | |
| 1953 | 26.5 | 3.9 | 10.0 | 27.8 | 12.5 | 21.8 | 8.6 | 23.5 | 19.3 | 8.2 | 1.6 | 2.5 | 13.9 | |
| 1954 | 0.2 | 0.5 | 10.9 | 1.8 | 0.8 | 0.2 | 4.8 | 8.4 | 1.5 | 7.0 | 9.2 | 7.6 | 4.4 | m |
| 1955 | 23.1 | 20.8 | 4.9 | 11.3 | 28.9 | 31.7 | 26.7 | 40.7 | 42.7 | 58.5 | 89.2 | 76.9 | 38.0 | |
| 1956 | 73.6 | 124.0 | 118.4 | 110.7 | 136.6 | 116.6 | 129.1 | 169.6 | 173.2 | 155.3 | 201.3 | 192.1 | 141.7 | |
| 1957 | 165.0 | 130.2 | 157.4 | 175.2 | 164.6 | 200.7 | 187.2 | 158.0 | 235.8 | 253.8 | 210.9 | 239.4 | 190.2 | M |
| 1958 | 202.5 | 164.9 | 190.7 | 196.0 | 175.3 | 171.5 | 191.4 | 200.2 | 201.2 | 181.5 | 152.3 | 187.6 | 184.8 | |
| 1959 | 217.4 | 143.1 | 185.7 | 163.3 | 172.0 | 168.7 | 149.6 | 199.6 | 145.2 | 111.4 | 124.0 | 125.0 | 159.0 | |
| 1960 | 146.3 | 106.0 | 102.2 | 122.0 | 119.6 | 110.2 | 121.7 | 134.1 | 127.2 | 82.8 | 89.6 | 85.6 | 122.3 | |
| 1961 | 57.9 | 46.1 | 53.0 | 61.4 | 51.0 | 77.4 | 70.2 | 55.8 | 63.6 | 37.7 | 32.6 | 39.9 | 53.9 | |
| 1962 | 38.7 | 50.3 | 45.6 | 46.4 | 43.7 | 42.0 | 21.8 | 21.8 | 51.3 | 39.5 | 26.9 | 23.2 | 37.6 | |
| 1963 | 19.8 | 24.4 | 17.1 | 29.3 | 43.0 | 35.9 | 19.6 | 33.2 | 38.8 | 35.3 | 23.4 | 14.9 | 27.9 | |
| 1964 | 15.3 | 17.7 | 16.5 | 8.6 | 9.5 | 9.1 | 3.1 | 9.3 | 4.7 | 6.1 | 7.4 | 15.1 | 10.2 | m |
| 1965 | 17.5 | 14.2 | 11.7 | 6.8 | 24.1 | 15.9 | 11.9 | 8.9 | 16.8 | 20.1 | 15.8 | 17.0 | 15.1 | |
| 1966 | 28.2 | 24.4 | 25.3 | 48.7 | 45.3 | 47.7 | 56.7 | 51.2 | 50.2 | 57.2 | 57.2 | 70.4 | 47.0 | |
| 1967 | 110.9 | 93.6 | 111.8 | 69.5 | 86.5 | 67.3 | 91.5 | 107.2 | 76.8 | 88.2 | 94.3 | 126.4 | 93.8 | |
| 1968 | 121.8 | 111.9 | 92.2 | 81.2 | 127.2 | 110.3 | 96.1 | 109.3 | 117.2 | 107.7 | 86.0 | 109.8 | 105.9 | M |
| 1969 | 104.4 | 120.5 | 135.8 | 106.8 | 120.0 | 106.0 | 96.8 | 98.0 | 91.3 | 95.7 | 93.5 | 97.9 | 105.5 | |
| 1970 | 111.5 | 127.8 | 102.9 | 109.5 | 127.5 | 106.8 | 112.5 | 93.0 | 99.5 | 86.6 | 95.2 | 83.5 | 104.5 | |
| 1971 | 91.3 | 79.0 | 60.7 | 71.8 | 57.5 | 49.8 | 81.0 | 61.4 | 50.2 | 51.7 | 63.2 | 82.2 | 66.6 | |
| 1972 | 61.5 | 88.4 | 80.1 | 63.2 | 80.5 | 88.0 | 76.5 | 76.8 | 64.0 | 61.3 | 41.6 | 45.3 | 68.9 | |
| 1973 | 43.4 | 42.9 | 46.0 | 57.7 | 42.4 | 39.5 | 23.1 | 25.6 | 59.3 | 30.7 | 23.9 | 23.3 | 38.0 | |
| 1974 | 27.6 | 26.0 | 21.3 | 40.3 | 39.5 | 36.0 | 55.8 | 33.6 | 40.2 | 47.1 | 25.0 | 20.5 | 34.5 | |
| 1975 | 18.9 | 11.5 | 11.5 | 5.1 | 9.0 | 11.4 | 28.2 | 39.7 | 13.9 | 9.1 | 19.4 | 7.8 | 15.5 | |
| 1976 | 8.1 | 4.3 | 21.9 | 18.8 | 12.4 | 12.2 | 1.9 | 16.4 | 13.5 | 20.6 | 5.2 | 15.3 | 12.6 | m |
| 1977 | 16.4 | 23.1 | 8.7 | 12.9 | 18.6 | 38.5 | 21.4 | 30.1 | 44.0 | 43.8 | 29.1 | 43.2 | 27.5 | |
| 1978 | 51.9 | 93.6 | 76.5 | 99.7 | 82.7 | 95.1 | 70.4 | 58.1 | 138.2 | 125.1 | 97.9 | 122.7 | 92.5 | |
| 1979 | 166.6 | 137.5 | 138.0 | 101.5 | 134.4 | 149.5 | 159.4 | 142.2 | 188.4 | 186.2 | 183.3 | 176.3 | 155.4 | M |
| 1980 | 159.6 | 155.0 | 126.2 | 164.1 | 179.9 | 157.3 | 136.3 | 135.4 | 155.0 | 164.7 | 147.9 | 174.4 | 154.6 | |
| 1981 | 114.0 | 141.3 | 135.5 | 156.4 | 127.5 | 90.9 | 143.8 | 158.7 | 167.3 | 162.4 | 137.5 | 150.1 | 140.4 | |
| 1982 | 111.2 | 163.6 | 153.8 | 122.0 | 82.2 | 110.4 | 106.1 | 107.6 | 118.8 | 94.7 | 98.1 | 127.0 | 115.9 | |
| 1983 | 84.3 | 51.0 | 66.5 | 80.7 | 99.2 | 91.1 | 82.2 | 71.8 | 50.3 | 55.8 | 33.3 | 33.4 | 66.6 | |
| 1984 | 57.0 | 85.4 | 83.5 | 69.7 | 76.4 | 46.1 | 37.4 | 25.5 | 15.7 | 12.0 | 22.8 | 18.7 | 45.9 | |
| 1985 | 16.5 | 15.9 | 17.2 | 16.2 | 27.5 | 24.2 | 30.7 | 11.1 | 3.9 | 18.6 | 16.2 | 17.3 | 17.9 | |
| 1986 | 2.5 | 23.2 | 15.1 | 18.5 | 13.7 | 1.1 | 18.1 | 7.4 | 3.8 | 35.4 | 15.2 | 6.8 | 13.4 | m |
| 1987 | 10.4 | 2.4 | 14.7 | 39.6 | 33.0 | 17.4 | 33.0 | 38.7 | 33.9 | 60.6 | 39.9 | 27.1 | 29.4 | |
| 1988 | 59.0 | 40.0 | 76.2 | 88.0 | 60.1 | 101.8 | 113.8 | 111.6 | 120.1 | 125.1 | 125.1 | 179.2 | 100.2 | |
| 1989 | 161.3 | 165.1 | 131.4 | 130.6 | 138.5 | 196.2 | 126.9 | 168.9 | 176.7 | 159.4 | 173.0 | 165.5 | 157.6 | M |
| 1990 | 177.3 | 130.5 | 140.3 | 140.3 | 132.2 | 105.4 | 149.4 | 200.3 | 125.2 | 145.5 | 131.4 | 129.7 | 142.6 | |
| 1991 | 136.9 | 167.5 | 141.9 | 140.0 | 121.3 | 169.7 | 173.7 | 176.3 | 125.3 | 144.1 | 108.2 | 144.4 | 145.7 | |
| 1992 | 150.0 | 161.1 | 106.7 | 99.8 | 73.8 | 65.2 | 85.7 | 64.5 | 63.9 | 88.7 | 91.8 | 82.6 | 94.3 | |
| 1993 | 59.3 | 91.0 | 69.8 | 62.2 | 61.3 | 49.8 | 57.9 | 42.2 | 22.4 | 56.4 | 35.6 | 48.9 | 54.6 | |
| 1994 | 57.8 | 35.5 | 31.7 | 16.1 | 17.8 | 28.0 | 35.1 | 22.5 | 25.7 | 44.0 | 18.0 | 26.2 | 29.9 | |
| 1995 | 24.2 | 29.9 | 31.1 | 14.0 | 14.5 | 15.6 | 14.5 | 14.3 | 11.8 | 21.1 | 9.0 | 10.0 | 17.5 | |
| 1996 | 11.5 | 4.4 | 9.2 | 4.8 | 5.5 | 11.8 | 8.2 | 14.4 | 1.6 | 0.9 | 17.9 | 13.3 | 8.6 | m |
| 1997 | 5.7 | 7.6 | 8.7 | 15.5 | 18.5 | 12.7 | 10.4 | 24.4 | 51.3 | 22.8 | 39.0 | 41.2 | 21.5 | |
| 1998 | 31.9 | 40.3 | 54.8 | 53.4 | 56.3 | 70.7 | 66.6 | 92.2 | 92.9 | 55.5 | 74.0 | 81.9 | 64.3 | |
| 1999 | 62.4 | 66.1 | 69.1 | 63.9 | 106.3 | | | | | | | | 73.6 | |

Values are preliminary after Dec 98. For the yearly means, each 'M' marks a sunspot cycle maximum and each 'm' a minimum.

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | Imp See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GOES | 01 | 2225 | 2228 | 2230 | | | | | | 5 | | B 7.3 | | | | | | 1.9E-04 |
| GOES | | 2254 | 2300 | 2306 | N22 | W40 | 8524 | | | 12 | SF | C 3.0 | | | | | | 1.3E-03 |
| HOLL | | 2258 | 2259 | 2308 | N22 | W40 | 8524 | 04 | 29.0 | 10 | SF | | 3 | E | | 47 | | F |
| GOES | 02 | 0547 | 0551 | 0553 | | | | | | 6 | | B 7.4 | | | | | | 2.3E-04 |
| GOES | | 0752 | 0800 | 0810 | N21 | W43 | 8524 | | | 18 | SF | C 4.1 | | | | | | 2.9E-03 |
| LEAR | | 0754 | 0759 | 0816 | N21 | W43 | 8524 | 04 | 29.1 | 22 | SF | | 4 | E | | 56 | | F |
| GOES | | 0958 | 1003 | 1009 | | | | | | 11 | | C 7.5 | | | | | | 2.9E-03 |
| RAMY | | 1218 | 1221 | 1235 | N16 | E42 | 8525 | 05 | 5.7 | 17 | SF | | 3 | E | | 19 | | |
| GOES | | 1436 | 1446 | 1456 | N16 | E42 | | | | 20 | 1F | C 2.0 | | | | | | 1.9E-03 |
| HOLL | | 1437 | 1440 | 1502 | N16 | E42 | 8525 | 05 | 5.8 | 25 | 1F | | 3 | E | | 102 | | |
| RAMY | | 1439E | 1440U | 1503D | N17 | E43 | 8525 | 05 | 5.9 | 24D | SF | | 3 | E | | 64 | | F |
| SVTO | | 1439E | 1443U | 1505 | N17 | E44 | 8525 | 05 | 5.9 | 26D | SF | | 2 | E | | 61 | | F |
| HOLL | | 1505 | 1506 | 1510 | N16 | E43 | 8525 | 05 | 5.9 | 5 | SF | | 3 | E | | 17 | | |
| GOES | | 1637 | 1652 | 1716 | N24 | E52 | 8527 | | | 39 | SF | C 2.2 | | | | | | 6.7E-03 |
| RAMY | | 1703 | 1707 | 1713 | N24 | E52 | 8527 | 05 | 6.7 | 10 | SF | | 3 | E | | 27 | | |
| RAMY | | 1846 | 1846 | 1851 | N21 | W49 | 8524 | 04 | 29.1 | 5 | SF | | 3 | E | | 14 | | FH |
| HOLL | | 2201 | 2204 | 2209 | N16 | E38 | 8525 | 05 | 5.8 | 8 | SF | | 3 | E | | 39 | | F |
| GOES | | 2333 | 2336 | 2338 | | | | | | 5 | | B 7.8 | | | | | | 2.0E-04 |
| GOES | 03 | 0536 | 0602 | 0632 | N15 | E32 | | | | 56 | 2N | M 4.4 | | | | | | 9.9E-02 |
| LEAR | | 0543 | 0551 | 0745 | N15 | E32 | 8525 | 05 | 5.7 | 122 | 2N | | 3 | E | | 527 | | U |
| SVTO | | 0613E | 0614U | 0753 | N15 | E31 | 8525 | 05 | 5.6 | 100D | 2F | | 3 | E | | 339 | | U |
| SVTO | | 0801 | 0801 | 0810 | N15 | E31 | 8525 | 05 | 5.7 | 9 | SF | | 3 | E | | 18 | | |
| SVTO | | 0811 | 0829 | 0840D | N15 | E31 | 8525 | 05 | 5.7 | 29D | SF | | 3 | E | | 37 | | |
| LEAR | | 0829 | 0830 | 0833 | N19 | E39 | 8525 | 05 | 6.3 | 4 | SF | | 3 | E | | 25 | | |
| SVTO | | 0932 | 0933 | 0935 | N15 | E22 | 8525 | 05 | 5.1 | 3 | SF | | 3 | E | | 15 | | |
| GOES | | 1016 | 1019 | 1021 | N21 | W58 | 8524 | | | 5 | SF | C 2.0 | | | | | | 4.5E-04 |
| SVTO | | 1019 | 1019U | 1027D | N21 | W58 | 8524 | 04 | 29.1 | 8D | SF | | 3 | E | | 21 | | |
| GOES | | 1036 | 1039 | 1041 | | | | | | 5 | | C 1.2 | | | | | | 3.1E-04 |
| GOES | | 1250 | 1254 | 1257 | N24 | W60 | 8524 | | | 7 | SF | C 1.1 | | | | | | 3.5E-04 |
| SVTO | | 1253 | 1254 | 1258 | N24 | W60 | 8524 | 04 | 29.0 | 5 | SF | | 3 | E | | 17 | | F |
| GOES | | 1530 | 1538 | 1541 | N22 | W60 | 8524 | | | 11 | SF | C 2.7 | | | | | | 1.2E-03 |
| RAMY | | 1533 | 1534 | 1544 | N22 | W60 | 8524 | 04 | 29.1 | 11 | SF | | 3 | E | | 50 | | |
| GOES | | 1811 | 1814 | 1817 | | | | | | 6 | | B 7.2 | | | | | | 2.0E-04 |
| GOES | | 1918 | 1923 | 1927 | N22 | W62 | 8524 | | | 9 | SF | C 1.0 | | | | | | 4.0E-04 |
| RAMY | | 1919 | 1921 | 1934 | N22 | W62 | 8524 | 04 | 29.1 | 15 | SF | | 3 | E | | 25 | | |
| HOLL | | 1921 | 1922 | 1931 | N22 | W62 | 8524 | 04 | 29.1 | 10 | SF | | 3 | E | | 37 | | |
| RAMY | | 2044 | 2045 | 2048 | N22 | W16 | 8526 | 05 | 2.6 | 4 | SF | | 3 | E | | 10 | | |
| GOES | | 2238 | 2241 | 2243 | | | | | | 5 | | B 5.9 | | | | | | 1.5E-04 |
| GOES | | 2307 | 2311 | 2313 | | | | | | 6 | | M 1.9 | | | | | | 2.8E-03 |
| GOES | 04 | 0636 | 0643 | 0655 | | | | | | 19 | | C 1.1 | | | | | | 1.1E-03 |
| GOES | | 1009 | 1015 | 1027 | | | | | | 18 | | C 1.1 | | | | | | 1.1E-03 |
| GOES | | 1125 | 1128 | 1133 | | | | | | 8 | | B 9.3 | | | | | | 4.0E-04 |
| GOES | | 1258 | 1302 | 1306 | | | | | | 8 | | C 1.0 | | | | | | 4.1E-04 |
| GOES | | 1746 | 1750 | 1754 | | | | | | 8 | | C 1.0 | | | | | | 4.3E-04 |
| GOES | | 1801 | 1805 | 1808 | | | | | | 7 | | C 1.1 | | | | | | 4.3E-04 |
| GOES | | 1816 | 1858 | 1916 | | | | | | 60 | | C 2.8 | | | | | | 7.4E-03 |
| RAMY | | 1822 | 1900 | 1931 | N26 | E20 | 8527 | 05 | 6.3 | 69 | 1F | | 3 | E | | 174 | | F |
| HOLL | | 1831 | 1844 | 1846 | N23 | E23 | 8527 | 05 | 6.5 | 15 | SF | | 3 | E | | 40 | | |
| HOLL | | 1846 | 1858 | 1924 | N24 | E24 | 8527 | 05 | 6.6 | 38 | 1F | | 3 | E | | 156 | | F |
| HOLL | | 1929 | 1931 | 1935 | N23 | E26 | 8527 | 05 | 6.8 | 6 | SF | | 3 | E | | 11 | | |
| GOES | | 2104 | 2109 | 2111 | | | | | | 7 | | C 1.3 | | | | | | 4.3E-04 |
| GOES | | 2138 | 2143 | 2145 | | | | | | 7 | | C 1.7 | | | | | | 5.4E-04 |
| GOES | | 2246 | 2249 | 2251 | | | | | | 5 | | C 1.2 | | | | | | 2.9E-04 |
| GOES | | 2341 | 2344 | 2346 | | | | | | 5 | | C 1.7 | | | | | | 3.9E-04 |
| GOES | 05 | 0818 | 0831 | 0844 | | | | | | 26 | | C 1.2 | | | | | | 1.8E-03 |
| GOES | | 1234 | 1245 | 1304 | | | | | | 30 | | C 1.0 | | | | | | 1.6E-03 |
| GOES | | 1512 | 1530 | 1540 | | | | | | 28 | | C 1.4 | | | | | | 1.8E-03 |
| GOES | 06 | 0121 | 0135 | 0146 | | | | | | 25 | | C 3.3 | | | | | | 3.5E-03 |
| GOES | | 1040 | 1048 | 1103 | S18 | E71 | 8534 | | | 23 | SF | C 2.4 | | | | | | 2.4E-03 |
| SVTO | | 1041 | 1048 | 1059 | S18 | E71 | 8534 | 05 | 11.8 | 18 | SF | | 3 | E | | 69 | | |
| RAMY | | 1046E | 1046U | 1059D | S17 | E71 | 8534 | 05 | 11.8 | 13D | SN | | 3 | E | | 30 | | H |
| SVTO | | 1047 | 1058 | 1119 | N18 | W07 | 8525 | 05 | 5.9 | 32 | SF | | 3 | E | | 96 | | F |
| RAMY | | 1314 | 1314 | 1320 | N20 | W12 | 8525 | 05 | 5.6 | 6 | SF | | 3 | E | | 14 | | |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | Imp See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GOES | 06 | 1319 | 1330 | 1351 | N20 | W12 | 8525 | | | 32 | SF | C 1.3 | | | | | | 2.1E-03 |
| RAMY | | 1323 | 1327 | 1349 | N20 | W12 | 8525 | 05 | 5.6 | 26 | SF | | 3 | E | | 23 | | |
| RAMY | | 1323 | 1332 | 1345 | N25 | W05 | 8527 | 05 | 6.2 | 22 | SF | | 3 | E | | 11 | | |
| SVTO | | 1323 | 1333U | 1339 | N22 | W08 | 8525 | 05 | 5.9 | 16 | SF | | 3 | E | | 55 | | F |
| HOLL | | 1327 | 1333 | 1342 | N21 | W11 | 8525 | 05 | 5.7 | 15 | SF | | 3 | E | | 17 | | |
| SVTO | | 1341 | 1341 | 1350 | N15 | W12 | 8525 | 05 | 5.7 | 9 | SF | | 3 | E | | 26 | | F |
| RAMY | | 1444 | 1444 | 1450 | N02 | E63 | 8533 | 05 | 11.3 | 6 | SF | | 3 | E | | 19 | | |
| HOLL | | 1445 | 1445 | 1449 | N02 | E63 | 8533 | 05 | 11.3 | 4 | SF | | 3 | E | | 13 | | |
| SVTO | | 1445 | 1445 | 1451 | N01 | E63 | 8533 | 05 | 11.3 | 6 | SF | | 3 | E | | 16 | | |
| GOES | | 1942 | 1946 | 1951 | | | | | | 9 | | C 1.1 | | | | | | 5.8E-04 |
| GOES | | 2157 | 2207 | 2220 | | | | | | 23 | | C 3.1 | | | | | | 3.2E-03 |
| GOES | 07 | 0032 | 0042 | 0059 | | | | | | 27 | | C 3.1 | | | | | | 3.7E-03 |
| LEAR | | 0254 | 0254 | 0259 | N13 | E55 | | 05 | 11.3 | 5 | SF | | 3 | E | | 14 | | |
| GOES | | 0302 | 0311 | 0316 | | | | | | 14 | | C 1.8 | | | | | | 1.4E-03 |
| GOES | | 0428 | 0441 | 0449 | N20 | E87 | | | | 21 | SF | M 3.2 | | | | | | 2.2E-02 |
| LEAR | | 0445 | 0446 | 0454 | N20 | E87 | | 05 | 13.8 | 9 | SF | | 4 | E | | 14 | | |
| SVTO | | 0655 | 0700 | 0723 | N15 | E59 | 8539 | 05 | 11.7 | 28 | SF | | 3 | E | | 54 | | |
| GOES | | 0655 | 0703 | 0715 | N15 | E59 | 8526 | | | 20 | SF | C 3.2 | | | | | | 3.2E-03 |
| LEAR | | 0657 | 0700 | 0720 | N15 | E58 | 8539 | 05 | 11.7 | 23 | SF | | 4 | E | | 52 | | E |
| LEAR | | 0700 | 0710 | 0717 | N18 | W53 | 8526 | 05 | 3.2 | 17 | SF | | 4 | E | | 11 | | |
| SVTO | | 0914 | 0914 | 0921 | N20 | W54 | 8537 | 05 | 3.2 | 7 | SF | | 3 | E | | 16 | | |
| GOES | | 1004 | 1022 | 1040 | | | | | | 36 | | C 2.9 | | | | | | 5.1E-03 |
| SVTO | | 1249 | 1259 | 1313 | N14 | E55 | 8539 | 05 | 11.7 | 24 | SF | | 3 | E | | 11 | | |
| RAMY | | 1336 | 1338 | 1344 | S26 | E46 | 8536 | 05 | 11.1 | 8 | SF | | 3 | E | | 44 | | |
| HOLL | | 1336 | 1338 | 1344 | S25 | E46 | | 05 | 11.1 | 8 | SF | | 3 | E | | 36 | | |
| SVTO | | 1336 | 1338 | 1349 | S27 | E46 | | 05 | 11.1 | 13 | SF | | 3 | E | | 45 | | H |
| SVTO | | 1356 | 1357 | 1400 | N19 | W21 | 8525 | 05 | 6.0 | 4 | SF | | 3 | E | | 17 | | |
| SVTO | | 1414 | 1427U | 1529D | N17 | W25 | 8525 | 05 | 5.7 | 75D | 2N | | 3 | E | | 334 | | |
| RAMY | | 1416 | 1427 | 1506 | N20 | W21 | 8525 | 05 | 6.0 | 50 | 1F | | 3 | E | | 214 | | S |
| GOES | | 1423 | 1432 | 1459 | N20 | W21 | 8525 | | | 36 | 1F | C 7.4 | | | | | | 1.4E-02 |
| HOLL | | 1424 | 1424U | | N18 | W25 | 8525 | 05 | 5.7 | 576 | 2F | | 3 | E | | 281 | | |
| HOLL | | 1425 | 1426 | 1510 | N27 | W17 | 8527 | 05 | 6.3 | 45 | SF | | 3 | E | | 33 | | |
| HOLL | | 1608 | 1612 | 1614 | N18 | W59 | 8537 | 05 | 3.2 | 6 | SF | | 3 | E | | 15 | | |
| RAMY | | 1620 | 1621 | 1625 | S26 | E44 | 8536 | 05 | 11.1 | 5 | SF | | 3 | E | | 16 | | |
| HOLL | | 1620 | 1621 | 1626 | S25 | E45 | 8536 | 05 | 11.2 | 6 | SF | | 3 | E | | 19 | | |
| RAMY | | 1628 | 1628 | 1634 | N19 | W56 | 8537 | 05 | 3.4 | 6 | SF | | 3 | E | | 15 | | |
| RAMY | | 1630 | 1633 | 1638 | S26 | E42 | 8536 | 05 | 10.9 | 8 | SF | | 3 | E | | 18 | | |
| HOLL | | 1631 | 1633 | 1636 | S25 | E43 | 8536 | 05 | 11.0 | 5 | SF | | 3 | E | | 16 | | |
| HOLL | | 1712 | 1715 | 1723 | N14 | E53 | 8539 | 05 | 11.7 | 11 | SF | | 3 | E | | 19 | | |
| RAMY | | 1722 | 1722 | 1725 | N11 | W30 | 8538 | 05 | 5.5 | 3 | SF | | 3 | E | | 15 | | |
| HOLL | | 1755 | 1758 | 1802 | N19 | W59 | 8537 | 05 | 3.2 | 7 | SF | | 3 | E | | 12 | | |
| GOES | | 1828 | 1834 | 1836 | N12 | W30 | 8525 | | | 8 | SF | C 2.3 | | | | | | 7.3E-04 |
| HOLL | | 1829 | 1830 | 1833 | N12 | W30 | 8525 | 05 | 5.5 | 4 | SF | | 3 | E | | 10 | | |
| HOLL | | 1842 | 1852 | 1925 | N15 | E56 | 8539 | 05 | 12.0 | 43 | SF | | 3 | E | | 53 | | |
| HOLL | | 1942 | 1943 | 1948 | N20 | W60 | 8537 | 05 | 3.2 | 6 | SF | | 3 | E | | 47 | | |
| HOLL | | 1953 | 1958 | 2004 | N20 | W72 | 8537 | 05 | 2.3 | 11 | SF | | 3 | E | | 10 | | |
| HOLL | | 2059 | 2100 | 2104 | N21 | E80 | | 05 | 14.0 | 5 | SF | | 3 | E | | 25 | | |
| GOES | | 2116 | 2119 | 2122 | N16 | E50 | | | | 6 | SF | C 2.1 | | | | | | 6.6E-04 |
| HOLL | | 2117 | 2121 | 2157 | N16 | E50 | 8539 | 05 | 11.7 | 40 | SF | | 3 | E | | 28 | | F |
| HOLL | | 2145 | 2146 | 2201 | S25 | E39 | 8536 | 05 | 10.9 | 16 | SF | | 3 | E | | 56 | | |
| HOLL | | 2331 | 2332 | 2334 | N20 | W62 | 8537 | 05 | 3.2 | 3 | SF | | 3 | E | | 16 | | |
| GOES | 08 | 0013 | 0017 | 0019 | | | | | | 6 | | C 2.0 | | | | | | 6.1E-04 |
| LEAR | | 0037 | 0037 | 0041 | N19 | W63 | 8537 | 05 | 3.2 | 4 | SF | | 2 | E | | 11 | | |
| GOES | | 0100 | 0112 | 0123 | N20 | W62 | 8537 | | | 23 | SF | C 3.3 | | | | | | 4.2E-03 |
| LEAR | | 0101 | 0104 | 0109 | N20 | W62 | 8537 | 05 | 3.3 | 8 | SF | | 3 | E | | 11 | | |
| LEAR | | 0119 | 0119 | 0122 | N20 | W61 | 8537 | 05 | 3.4 | 3 | SF | | 3 | E | | 16 | | |
| LEAR | | 0141 | 0142 | 0148 | N19 | W61 | 8537 | 05 | 3.4 | 7 | SF | | 3 | E | | 23 | | |
| GOES | | 0155 | 0203 | 0211 | N19 | W62 | 8537 | | | 16 | SF | C 4.6 | | | | | | 4.0E-03 |
| LEAR | | 0157 | 0157 | 0215 | N19 | W62 | 8537 | 05 | 3.3 | 18 | SF | | 3 | E | | 24 | | |
| GOES | | 0248 | 0251 | 0254 | | | | | | 6 | | C 3.1 | | | | | | 9.9E-04 |
| LEAR | | 0326 | 0332 | 0336 | N19 | W62 | 8537 | 05 | 3.4 | 10 | SF | | 3 | E | | 11 | | |
| LEAR | | 0345 | 0346 | 0348 | N20 | W77 | 8526 | 05 | 2.3 | 3 | SF | | 3 | E | | 11 | | |
| LEAR | | 0411 | 0411 | 0415 | N17 | W66 | 8537 | 05 | 3.1 | 4 | SF | | 3 | E | | 23 | | |
| GOES | | 0505 | 0515 | 0518 | N17 | W67 | 8537 | | | 13 | SF | C 3.2 | | | | | | 2.4E-03 |
| LEAR | | 0512 | 0517 | 0521 | N17 | W67 | 8537 | 05 | 3.1 | 9 | SF | | 3 | E | | 19 | | F |
| LEAR | | 0532 | 0534 | 0537 | N19 | W63 | 8537 | 05 | 3.4 | 5 | SF | | 3 | E | | 30 | | |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | Imp See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GOES | 08 | 1036 | 1058 | 1114 | N18 | E64 | | | | 38 | SF | M 1.6 | | | | | | 2.3E-02 |
| RAMY | | 1052E | 1104U | 1146 | N18 | E64 | 8541 | 05 | 13.3 | 54D | SF | | 3 | E | | 89 | | F |
| SVTO | | 1102E | 1106U | 1108D | N21 | E73 | 8541 | 05 | 14.0 | 6D | 1F | | 2 | E | | 100 | | F |
| RAMY | | 1123 | 1126 | 1137 | N21 | W71 | 8537 | 05 | 3.0 | 14 | SF | | 3 | E | | 37 | | |
| RAMY | | 1143 | 1143 | 1154 | N17 | E19 | 8531 | 05 | 9.9 | 11 | SF | | 3 | E | | 10 | | |
| RAMY | | 1156 | 1158 | 1212 | N20 | W69 | 8537 | 05 | 3.2 | 16 | SF | | 3 | E | | 34 | | F |
| RAMY | | 1223 | 1223 | 1231 | N19 | W70 | 8537 | 05 | 3.2 | 8 | SF | | 3 | E | | 13 | | |
| RAMY | | 1258 | 1306 | 1320 | N19 | W72 | 8537 | 05 | 3.0 | 22 | SF | | 3 | E | | 17 | | FH |
| RAMY | | 1323 | 1324 | 1337 | N19 | W70 | 8537 | 05 | 3.2 | 14 | SF | | 3 | E | | 20 | | |
| RAMY | | 1342 | 1345 | 1354 | N19 | W71 | 8537 | 05 | 3.1 | 12 | SF | | 3 | E | | 26 | | |
| HOLL | | 1348 | 1348 | 1353 | N20 | E70 | 8541 | 05 | 13.9 | 5 | SF | | 3 | E | | 18 | | |
| SVTO | | 1350 | 1354 | 1357 | N22 | W79 | 8537 | 05 | 2.5 | 7 | SF | | 3 | E | | 10 | | |
| SVTO | | 1353 | 1411 | 1422 | N19 | E71 | 8541 | 05 | 14.0 | 29 | SF | | 3 | E | | 50 | | F |
| HOLL | | 1356 | 1410 | 1433 | N21 | E72 | 8541 | 05 | 14.1 | 37 | SF | | 3 | E | | 47 | | |
| GOES | | 1401 | 1408 | 1414 | N19 | E71 | 8541 | | | 13 | SF | C 4.2 | | | | | | 3.0E-03 |
| GOES | | 1422 | 1440 | 1501 | N23 | W75 | 8526 | | | 39 | 1F | M 4.6 | | | | | | 7.4E-02 |
| HOLL | | 1425 | 1429 | 1506 | N19 | W68 | 8537 | 05 | 3.4 | 41 | SF | | 3 | E | | 62 | | |
| SVTO | | 1425 | 1429 | 1511 | N23 | W75 | 8526 | 05 | 2.8 | 46 | 1F | | 3 | E | | 168 | | |
| SVTO | | 1502 | 1502 | 1515 | N28 | E08 | | 05 | 9.2 | 13 | SF | | 3 | E | | 11 | | |
| HOLL | | 1509 | 1510 | 1528 | N15 | W38 | 8525 | 05 | 5.7 | 19 | SF | | 3 | E | | 37 | | |
| SVTO | | 1510 | 1510 | 1528 | N17 | W34 | 8525 | 05 | 6.0 | 18 | SF | | 3 | E | | 30 | | F |
| SVTO | | 1519 | 1520 | 1530 | N23 | W25 | 8527 | 05 | 6.7 | 11 | SF | | 3 | E | | 13 | | |
| SVTO | | 1547 | 1547 | 1550 | N21 | W78 | 8526 | 05 | 2.7 | 3 | SF | | 3 | E | | 25 | | |
| HOLL | | 1719 | 1720 | 1725 | N19 | W72 | 8537 | 05 | 3.2 | 6 | SF | | 3 | E | | 55 | | |
| HOLL | | 1822 | 1835 | 1858 | N19 | W74 | 8537 | 05 | 3.1 | 36 | SF | | 3 | E | | 66 | | |
| HOLL | | 1905 | 1917 | 1927 | N19 | W70 | 8537 | 05 | 3.4 | 22 | SF | | 3 | E | | 44 | | |
| HOLL | | 1926 | 1930 | 1933 | N21 | E71 | 8541 | 05 | 14.2 | 7 | SF | | 3 | E | | 11 | | |
| HOLL | | 1939 | 2031 | 2100 | N19 | W75 | 8537 | 05 | 3.1 | 81 | 1F | | 3 | E | | 111 | | F |
| GOES | | 1945 | 1948 | 1951 | N19 | W75 | 8537 | | | 6 | 1F | C 2.1 | | | | | | 6.8E-04 |
| HOLL | | 2105 | 2116 | 2155 | N19 | W77 | 8537 | 05 | 3.0 | 50 | SF | | 3 | E | | 89 | | |
| GOES | | 2111 | 2115 | 2118 | N19 | W77 | | | | 7 | SF | C 2.0 | | | | | | 6.9E-04 |
| HOLL | | 2156 | 2204 | 2221 | N20 | W77 | 8537 | 05 | 3.0 | 25 | SF | | 3 | E | | 83 | | |
| GOES | | 2201 | 2204 | 2206 | N20 | W77 | | | | 5 | SF | C 2.8 | | | | | | 6.8E-04 |
| HOLL | | 2226 | 2329 | 2444 | N21 | W78 | 8537 | 05 | 2.9 | 138 | 1F | | 3 | E | | 107 | | |
| HOLL | | 2255 | 2257 | 2259 | S23 | E27 | 8536 | 05 | 11.0 | 4 | SF | | 3 | E | | 63 | | |
| HOLL | | 2343 | 2442 | 2543 | N21 | E68 | 8541 | 05 | 14.2 | 120 | 2N | | 3 | E | | 260 | | |
| GOES | | 2359 | 2407 | 2421 | N21 | E69 | | | | 22 | SF | C 5.0 | | | | | | 5.2E-03 |
| LEAR | 09 | 0004 | 0004 | 0027 | N21 | E69 | 8541 | 05 | 14.3 | 23 | SF | | 4 | E | | 13 | | E |
| LEAR | | 0035 | 0044 | 0103 | N21 | E69 | 8541 | 05 | 14.3 | 28 | 1F | | 4 | E | | 106 | | |
| GOES | | 0036 | 0047 | 0058 | N21 | E69 | 8541 | | | 22 | 1F | M 1.1 | | | | | | 1.2E-02 |
| GOES | | 0251 | 0257 | 0303 | N21 | E67 | 8541 | | | 12 | SF | C 2.8 | | | | | | 1.9E-03 |
| LEAR | | 0254 | 0256 | 0301 | N21 | E67 | 8541 | 05 | 14.2 | 7 | SF | | 3 | E | | 63 | | |
| GOES | | 0432 | 0436 | 0441 | | | | | | 9 | | C 2.5 | | | | | | 1.3E-03 |
| LEAR | | 0605 | 0608 | 0613 | N17 | W82 | 8537 | 05 | 3.0 | 8 | SF | | 3 | E | | 18 | | |
| LEAR | | 0629 | 0629 | 0637 | N21 | E63 | 8541 | 05 | 14.1 | 8 | SF | | 3 | E | | 12 | | |
| LEAR | | 0639 | 0642 | 0647 | N18 | W78 | 8537 | 05 | 3.3 | 8 | SF | | 3 | E | | 36 | | |
| GOES | | 0938 | 0949 | 0955 | | | | | | 17 | | C 3.0 | | | | | | 2.3E-03 |
| GOES | | 1037 | 1041 | 1049 | | | | | | 12 | | C 3.2 | | | | | | 2.0E-03 |
| RAMY | | 1150 | 1150 | 1156 | N21 | W46 | 8525 | 05 | 6.0 | 6 | SF | | 3 | E | | 17 | | |
| GOES | | 1152 | 1227 | 1248 | | | | | | 56 | | M 1.0 | | | | | | 2.8E-02 |
| HOLL | | 1355 | 1358 | 1402 | N21 | E62 | 8541 | 05 | 14.3 | 7 | SF | | 2 | E | | 14 | | |
| GOES | | 1405 | 1408 | 1412 | | | | | | 7 | | C 3.7 | | | | | | 1.4E-03 |
| SVTO | | 1534 | 1534 | 1537 | N20 | W83 | 8537 | 05 | 3.3 | 3 | SF | | 3 | E | | 26 | | |
| RAMY | | 1534 | 1535 | 1539 | N19 | W89 | 8537 | 05 | 2.8 | 5 | SF | | 3 | E | | 55 | | |
| GOES | | 1606 | 1612 | 1619 | N20 | W89 | 8537 | | | 13 | SF | C 5.1 | | | | | | 2.9E-03 |
| RAMY | | 1609 | 1609 | 1614 | N20 | W89 | 8537 | 05 | 2.9 | 5 | SF | | 3 | E | | 12 | | |
| RAMY | | 1645 | 1645 | 1651 | N20 | E59 | 8541 | 05 | 14.2 | 6 | SF | | 3 | E | | 13 | | |
| RAMY | | 1653 | 1653 | 1657 | N12 | W57 | 8538 | 05 | 5.4 | 4 | SF | | 3 | E | | 11 | | |
| GOES | | 1753 | 1807 | 1815 | | | 8537 | | | 22 | | M 7.6 | | | | | | 6.1E-02 |
| HOLL | | 1754 | 1755 | 1803 | N20 | E29 | 8535 | 05 | 12.0 | 9 | SF | | 3 | E | | 21 | | |
| RAMY | | 1754 | 1755 | 1808 | N19 | E29 | 8535 | 05 | 11.9 | 14 | SF | | 3 | E | | 18 | | |
| HOLL | | 1755 | 1800 | 1805 | N21 | E55 | 8541 | 05 | 14.0 | 10 | SF | | 3 | E | | 11 | | |
| RAMY | | 1756 | 1756 | 1807 | N21 | E59 | 8541 | 05 | 14.3 | 11 | SF | | 3 | E | | 15 | | |
| RAMY | | 1806 | 1806 | 1813 | N18 | W02 | 8531 | 05 | 9.6 | 7 | SF | | 3 | E | | 24 | | F |
| RAMY | | 1940 | 1945 | 1954 | N20 | E57 | 8541 | 05 | 14.2 | 14 | SF | | 3 | E | | 16 | | |
| HOLL | | 1942 | 1945 | 1957 | N22 | E59 | 8541 | 05 | 14.3 | 15 | SF | | 3 | E | | 68 | | |
| RAMY | | 2106 | 2108 | 2119 | N21 | E55 | 8541 | 05 | 14.1 | 13 | SF | | 3 | E | | 11 | | |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | Imp See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HOLL | 09 | 2107 | 2108 | 2123 | N23 | E56 | 8541 | 05 | 14.2 | 16 | SF | | 3 | E | | 11 | | |
| HOLL | | 2116 | 2116 | 2122 | N20 | W89 | 8537 | 05 | 3.1 | 6 | SF | | 3 | E | | 13 | | |
| HOLL | | 2223 | 2235 | 2259 | N20 | E51 | 8541 | 05 | 13.8 | 36 | SF | | 3 | E | | 17 | | F |
| HOLL | | 2322 | 2327 | 2333 | N21 | E56 | 8541 | 05 | 14.3 | 11 | SF | | 3 | E | | 34 | | |
| HOLL | | 2325 | 2325 | 2329 | S29 | E56 | 8540 | 05 | 14.4 | 4 | SF | | 3 | E | | 12 | | |
| HOLL | | 2330 | 2332 | 2341 | S29 | E58 | 8540 | 05 | 14.5 | 11 | SF | | 3 | E | | 23 | | |
| HOLL | 10 | 0043 | 0045 | 0054 | N22 | E52 | 8541 | 05 | 14.0 | 11 | SF | | 3 | E | | 13 | | |
| GOES | | 0248 | 0251 | 0258 | | | | | | 10 | | C 3.3 | | | | | | 1.7E-03 |
| GOES | | 0302 | 0305 | 0307 | | | | | | 5 | | C 3.2 | | | | | | 8.5E-04 |
| GOES | | 0522 | 0531 | 0537 | N16 | E19 | 8539 | | | 15 | 2N | M 2.5 | | | | | | 1.4E-02 |
| LEAR | | 0524 | 0529 | 0605 | N16 | E19 | 8539 | 05 | 11.7 | 41 | 2N | | 3 | E | | 286 | | U |
| GOES | | 0711 | 0714 | 0718 | | | | | | 7 | | C 2.1 | | | | | | 8.3E-04 |
| GOES | | 0916 | 0923 | 0931 | | | | | | 15 | | C 5.3 | | | | | | 4.1E-03 |
| GOES | | 1112 | 1119 | 1124 | | | | | | 12 | | C 2.3 | | | | | | 1.5E-03 |
| RAMY | | 1155 | 1156 | 1207 | N20 | E48 | 8541 | 05 | 14.2 | 12 | SF | | 3 | E | | 13 | | |
| SVTO | | 1250E | 1301U | 1324D | N19 | E46 | 8541 | 05 | 14.0 | 34D | SF | | 3 | E | | 29 | | |
| GOES | | 1250 | 1308 | 1314 | N20 | E46 | 8541 | | | 24 | SF | C 1.9 | | | | | | 2.2E-03 |
| HOLL | | 1308E | 1309 | 1329 | N20 | E46 | 8541 | 05 | 14.1 | 21D | SF | | 3 | E | | 29 | | |
| RAMY | | 1310E | 1311 | 1334 | N20 | E47 | 8541 | 05 | 14.1 | 24D | SF | | 3 | E | | 44 | | FH |
| GOES | | 1406 | 1410 | 1429 | N20 | E46 | 8541 | | | 23 | SF | C 1.1 | | | | | | 1.6E-03 |
| RAMY | | 1406 | 1412 | 1423 | N20 | E46 | 8541 | 05 | 14.1 | 17 | SF | | 3 | E | | 21 | | FH |
| HOLL | | 1412 | 1413 | 1430 | N21 | E48 | 8541 | 05 | 14.3 | 18 | SF | | 3 | E | | 12 | | |
| RAMY | | 1543 | 1550 | 1612 | N19 | E46 | 8541 | 05 | 14.2 | 29 | SF | | 3 | E | | 29 | | |
| GOES | | 1544 | 1557 | 1601 | N21 | E47 | 8541 | | | 17 | SF | C 1.7 | | | | | | 1.5E-03 |
| HOLL | | 1554 | 1557 | 1602 | N21 | E47 | 8541 | 05 | 14.3 | 8 | SF | | 3 | E | | 18 | | |
| GOES | | 1728 | 1742 | 1751 | | | | | | 23 | | C 1.6 | | | | | | 2.0E-03 |
| GOES | | 2019 | 2022 | 2031 | S24 | E33 | 8540 | | | 12 | SF | C 1.3 | | | | | | 9.0E-04 |
| HOLL | | 2021 | 2021 | 2027 | S24 | E33 | 8540 | 05 | 13.4 | 6 | SF | | 3 | E | | 10 | | |
| GOES | | 2205 | 2211 | 2218 | | | | | | 13 | | C 1.6 | | | | | | 1.1E-03 |
| GOES | | 2301 | 2355 | 2453 | N22 | E44 | 8541 | | | 112 | SF | C 1.4 | | | | | | 8.0E-03 |
| HOLL | | 2314 | 2321 | 2346 | N22 | E44 | 8541 | 05 | 14.3 | 32 | SF | | 3 | E | | 17 | | |
| GOES | 11 | 0400 | 0405 | 0409 | | | | | | 9 | | C 1.3 | | | | | | 6.3E-04 |
| SVTO | | 0425 | 0425 | 0432 | N24 | E12 | 8535 | 05 | 12.1 | 7 | SF | | 3 | E | | 19 | | |
| GOES | | 0929 | 0935 | 0944 | N21 | E37 | 8541 | | | 15 | SF | C 2.0 | | | | | | 1.5E-03 |
| SVTO | | 0931 | 0933 | 0945 | N21 | E37 | 8541 | 05 | 14.2 | 14 | SF | | 3 | E | | 38 | | F |
| SVTO | | 0952 | 0956 | 1002 | N20 | E37 | 8541 | 05 | 14.2 | 10 | SF | | 3 | E | | 34 | | F |
| GOES | | 1106 | 1110 | 1114 | | | | | | 8 | | C 3.9 | | | | | | 1.2E-03 |
| GOES | | 1656 | 1700 | 1706 | | | | | | 10 | | C 1.3 | | | | | | 7.3E-04 |
| GOES | | 1904 | 1908 | 1915 | N20 | E02 | 8535 | | | 11 | SF | C 1.5 | | | | | | 8.6E-04 |
| HOLL | | 1906 | 1906 | 1914 | N20 | E02 | 8535 | 05 | 11.9 | 8 | SF | | 3 | E | | 20 | | F |
| HOLL | | 1910 | 1911 | 1914 | N21 | E31 | 8541 | 05 | 14.2 | 4 | SF | | 3 | E | | 25 | | F |
| HOLL | | 2025 | 2040 | 2127 | N22 | E31 | 8541 | 05 | 14.2 | 62 | 1F | | 3 | E | | 166 | | |
| GOES | | 2038 | 2041 | 2045 | N22 | E31 | 8541 | | | 7 | 1F | C 2.1 | | | | | | 7.6E-04 |
| HOLL | | 2042 | 2042 | 2101 | S26 | E22 | 8540 | 05 | 13.6 | 19 | SF | | 3 | E | | 10 | | |
| HOLL | | 2143 | 2146 | 2208 | S19 | E79 | | 05 | 17.9 | 25 | SF | | 3 | E | | 45 | | |
| GOES | | 2143 | 2208 | 2233 | S19 | E79 | | | | 50 | SF | C 4.7 | | | | | | 1.2E-02 |
| HOLL | | 2145 | 2146 | 2300 | N21 | E30 | 8540 | 05 | 14.2 | 75 | SF | | 3 | E | | 71 | | |
| HOLL | | 2228 | 2231 | 2248 | N21 | E28 | 8541 | 05 | 14.1 | 20 | SF | | 3 | E | | 24 | | |
| GOES | 12 | 0430 | 0437 | 0449 | | | | | | 19 | | C 2.2 | | | | | | 2.2E-03 |
| GOES | | 1928 | 1930 | 1933 | S16 | W18 | 8534 | | | 5 | SF | C 0.1 | | | | | | 3.0E-04 |
| HOLL | | 1928 | 1930 | 1938 | S16 | W18 | 8534 | 05 | 11.4 | 10 | SF | | 3 | E | | 27 | | |
| SVTO | 13 | 1203 | 1205 | 1210 | N20 | E04 | 8541 | 05 | 13.8 | 7 | SF | | 3 | E | | 14 | | |
| GOES | | 1309 | 1313 | 1316 | S16 | W28 | 8534 | | | 7 | SF | B 8.2 | | | | | | 2.7E-04 |
| SVTO | | 1312 | 1312 | 1326 | S16 | W28 | 8534 | 05 | 11.4 | 14 | SF | | 3 | E | | 40 | | F |
| SVTO | | 1328 | 1328 | 1332 | N03 | E54 | | 05 | 17.6 | 4 | SF | | 3 | E | | 11 | | |
| SVTO | | 1336 | 1338 | 1342 | N20 | E03 | 8541 | 05 | 13.8 | 6 | SF | | 3 | E | | 23 | | |
| SVTO | | 1625 | 1625 | 1634 | N18 | W53 | 8531 | 05 | 9.6 | 9 | SF | | 3 | E | | 19 | | |
| HOLL | | 2345 | 2347 | 2354 | S25 | W38 | 8536 | 05 | 11.0 | 9 | SF | | 3 | E | | 21 | | |
| GOES | 14 | 0344 | 0354 | 0402 | | | | | | 18 | | C 1.5 | | | | | | 1.3E-03 |
| GOES | | 0819 | 0847 | 0908 | | | | | | 49 | | C 1.0 | | | | | | 2.6E-03 |
| SVTO | | 0925 | 0928 | 0942 | S18 | W36 | 8534 | 05 | 11.6 | 17 | SF | | 3 | E | | 42 | | |
| GOES | | 0925 | 0929 | 0932 | S18 | W36 | 8534 | | | 7 | SF | B 9.3 | | | | | | 3.5E-04 |
| RAMY | | 1623 | 1634 | 1639 | S22 | E65 | 8544 | 05 | 19.7 | 16 | SF | | 3 | E | | 19 | | |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RAMY | 14 | 1804 | 1807 | 1812 | S22 | E64 | 8544 | 05 | 19.7 | 8 | SF | | 3 | E | | 27 | | |
| GOES | | 2158 | 2231 | 2246 | | | 8540 | | | 48 | | C 1.6 | | | | | | 3.6E-03 |
| HOLL | | 2201 | 2201 | 2224 | S25 | W53 | 8536 | 05 | 10.8 | 23 | SF | | 3 | E | | 21 | | F |
| HOLL | | 2226 | 2229 | 2248 | S28 | W16 | 8540 | 05 | 13.7 | 22 | SF | | 3 | E | | 44 | | F |
| HOLL | 15 | 0031 | 0031 | 0043 | S19 | E63 | 8544 | 05 | 19.8 | 12 | SF | | 3 | E | | 14 | | |
| HOLL | | 0056 | 0058 | 0102 | S19 | E61 | 8544 | 05 | 19.7 | 6 | SF | | 3 | E | | 17 | | |
| HOLL | | 0108 | 0112 | 0121 | S19 | E61 | 8544 | 05 | 19.7 | 13 | SF | | 3 | E | | 26 | | |
| SVTO | | 0747 | 0756 | 0832 | S19 | E59 | 8544 | 05 | 19.8 | 45 | SF | | 3 | E | | 12 | | |
| SVTO | | 0759 | 0807 | 0843 | N21 | W09 | 8541 | 05 | 14.6 | 44 | SF | | 3 | E | | 11 | | |
| LEAR | | 0837 | 0837 | 0842 | N21 | W11 | 8541 | 05 | 14.5 | 5 | SF | | 3 | E | | 19 | | |
| SVTO | | 0843 | 0843 | 0857 | N21 | W09 | 8541 | 05 | 14.7 | 14 | SF | | 3 | E | | 15 | | |
| SVTO | | 0843 | 0921U | 1049 | S22 | E57 | 8544 | 05 | 19.7 | 126 | SF | | 3 | E | | 14 | | |
| LEAR | | 0904 | 0905 | 0908 | S19 | E56 | 8544 | 05 | 19.6 | 4 | SF | | 3 | E | | 17 | | |
| GOES | | 0916 | 0921 | 0926 | S19 | E56 | 8544 | | | 10 | SF | B 6.8 | | | | | | 3.5E-04 |
| LEAR | | 0918 | 0920 | 0927D | S19 | E55 | 8544 | 05 | 19.6 | 9D | SF | | 3 | E | | 38 | | |
| SVTO | | 1120 | 1121 | 1128 | S19 | E56 | 8544 | 05 | 19.7 | 8 | SF | | 3 | E | | 12 | | |
| SVTO | | 1131 | 1134 | 1140 | S20 | E56 | 8544 | 05 | 19.8 | 9 | SF | | 3 | E | | 13 | | |
| RAMY | | 1635 | 1639 | 1643 | S25 | W61 | 8536 | 05 | 11.0 | 8 | SF | | 3 | E | | 11 | | |
| SVTO | | 1645 | 1646 | 1648 | S22 | E53 | 8544 | 05 | 19.8 | 3 | SF | | 3 | E | | 12 | | |
| GOES | | 1738 | 1741 | 1745 | S25 | W61 | 8536 | | | 7 | SF | B 6.1 | | | | | | 2.3E-04 |
| RAMY | | 1740 | 1743 | 1745 | S25 | W61 | 8536 | 05 | 11.0 | 5 | SF | | 3 | E | | 21 | | |
| LEAR | 16 | 0320 | 0324 | 0325 | S28 | W34 | 8540 | 05 | 13.5 | 5 | SF | | 3 | E | | 27 | | |
| GOES | | 1042 | 1054 | 1100 | | | | | | 18 | | B 9.3 | | | | | | 9.0E-04 |
| GOES | | 1345 | 1350 | 1353 | S17 | W75 | 8534 | | | 8 | 1N | M 1.2 | | | | | | 3.1E-03 |
| HOLL | | 1346 | 1350 | 1359 | S17 | W75 | 8534 | 05 | 10.9 | 13 | 1N | | 3 | E | | 121 | | |
| HOLL | | 1654 | 1655 | 1658 | S17 | W76 | 8534 | 05 | 10.9 | 4 | SF | | 3 | E | | 26 | | |
| GOES | | 1654 | 1657 | 1700 | S17 | W76 | 8534 | | | 6 | SF | C 1.0 | | | | | | 3.4E-04 |
| GOES | | 1720 | 1725 | 1728 | S17 | W76 | 8534 | | | 8 | SF | M 1.1 | | | | | | 2.7E-03 |
| RAMY | | 1721E | 1725U | 1731D | S16 | W75 | 8534 | 05 | 11.0 | 10D | SF | | 2 | E | | 60 | | H |
| HOLL | | 1723 | 1725 | 1733 | S17 | W76 | 8534 | 05 | 10.9 | 10 | SF | | 3 | E | | 70 | | |
| GOES | | 2007 | 2013 | 2023 | S16 | W77 | 8534 | | | 16 | 1F | C 5.7 | | | | | | 3.4E-03 |
| RAMY | | 2009 | 2011U | 2026D | S15 | W74 | 8534 | 05 | 11.2 | 17D | 1F | | 2 | E | | 118 | | H |
| HOLL | | 2010 | 2012 | 2024 | S16 | W77 | 8534 | 05 | 11.0 | 14 | 1F | | 3 | E | | 128 | | H |
| GOES | | 2225 | 2233 | 2237 | | | 8541 | | | 12 | | M 1.0 | | | | | | 4.1E-03 |
| HOLL | | 2227 | 2237 | 2240 | S17 | W78 | 8534 | 05 | 11.0 | 13 | SF | | 3 | E | | 20 | | H |
| HOLL | | 2233 | 2235 | 2248 | N22 | W37 | 8541 | 05 | 14.1 | 15 | SF | | 3 | E | | 37 | | F |
| GOES | 17 | 0018 | 0024 | 0028 | S16 | W79 | 8534 | | | 10 | SF | C 9.7 | | | | | | 3.4E-03 |
| HOLL | | 0020 | 0025 | 0034 | S16 | W79 | 8534 | 05 | 11.0 | 14 | SF | | 3 | E | | 59 | | H |
| GOES | | 0253 | 0258 | 0302 | | | | | | 9 | | C 1.6 | | | | | | 7.0E-04 |
| GOES | | 0339 | 0345 | 0349 | | | | | | 10 | | C 3.9 | | | | | | 1.5E-03 |
| GOES | | 0404 | 0407 | 0410 | | | | | | 6 | | C 1.2 | | | | | | 3.4E-04 |
| GOES | | 0449 | 0455 | 0500 | | | | | | 11 | | M 2.3 | | | | | | 7.7E-03 |
| GOES | | 0617 | 0620 | 0624 | | | | | | 7 | | C 1.4 | | | | | | 5.2E-04 |
| GOES | | 0702 | 0705 | 0708 | | | | | | 6 | | B 9.0 | | | | | | 2.8E-04 |
| GOES | | 0749 | 0753 | 0755 | | | | | | 6 | | C 2.0 | | | | | | 4.9E-04 |
| GOES | | 0819 | 0822 | 0824 | | | | | | 5 | | C 1.0 | | | | | | 2.6E-04 |
| GOES | | 0900 | 0907 | 0916 | S16 | W86 | 8534 | | | 16 | SF | C 5.3 | | | | | | 3.5E-03 |
| LEAR | | 0905 | 0907 | 0909 | S16 | W86 | 8534 | 05 | 10.8 | 4 | SF | | 3 | E | | 16 | | |
| HOLL | | 1306 | 1307 | 1319 | N21 | W43 | 8541 | 05 | 14.2 | 13 | SF | | 3 | E | | 33 | | |
| GOES | | 1318E | 1319 | 1320 | | | 8541 | | | 2D | | C 1.6 | | | | | | 1.9E-04 |
| HOLL | | 1437 | 1437 | 1442 | N35 | E44 | 8545 | 05 | 21.1 | 5 | SF | | 3 | E | | 13 | | |
| GOES | | 1700 | 1707 | 1713 | N20 | W49 | 8541 | | | 13 | 1F | C 6.2 | | | | | | 3.2E-03 |
| HOLL | | 1703 | 1706 | 1731 | N20 | W49 | 8541 | 05 | 14.0 | 28 | 1F | | 3 | E | | 101 | | F |
| RAMY | | 1706E | 1707U | 1732 | N20 | W48 | 8541 | 05 | 14.0 | 26D | SF | | 2 | E | | 90 | | F |
| GOES | | 1751 | 1803 | 1810 | S16 | W91 | 8534 | | | 19 | SF | C 5.6 | | | | | | 4.7E-03 |
| RAMY | | 1754 | 1759 | 1759D | S16 | W85 | 8534 | 05 | 11.3 | 5D | SF | | 3 | E | | 22 | | |
| HOLL | | 1758 | 1801 | 1803 | S16 | W91 | 8534 | 05 | 10.8 | 5 | SF | | 3 | E | | 19 | | |
| GOES | | 2001 | 2016 | 2021 | N22 | W54 | 8541 | | | 20 | SF | C 1.6 | | | | | | 1.4E-03 |
| HOLL | | 2004 | 2015 | 2032 | N22 | W54 | 8541 | 05 | 13.7 | 28 | SF | | 3 | E | | 86 | | F |
| RAMY | | 2015E | 2015U | 2030 | N21 | W46 | 8541 | 05 | 14.3 | 15D | SF | | 3 | E | | 86 | | F |
| GOES | | 2150 | 2202 | 2212 | | | | | | 22 | | M 1.0 | | | | | | 8.8E-03 |
| GOES | 18 | 0114 | 0134 | 0159 | | | | | | 45 | | C 3.3 | | | | | | 7.3E-03 |
| GOES | | 0311 | 0323 | 0331 | | | | | | 20 | | C 9.0 | | | | | | 6.8E-03 |
| LEAR | | 0359 | 0400 | 0418 | N19 | W52 | 8541 | 05 | 14.2 | 19 | SF | | 3 | E | | 79 | | |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | Imp See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEAR | 18 | 0543 | 0544 | 0554 | S28 | W72 | 8540 | 05 | 12.6 | 11 | SF | | 3 | E | | 35 | | |
| LEAR | | 0654 | 0655 | 0716 | N39 | E35 | 8545 | 05 | 21.1 | 22 | SF | | 3 | E | | 14 | | |
| GOES | | 0714 | 0718 | 0724 | N19 | W57 | 8541 | | | 10 | SF | C 2.1 | | | | | | 1.1E-03 |
| LEAR | | 0718 | 0718 | 0730 | N19 | W57 | 8541 | 05 | 13.9 | 12 | SF | | 3 | E | | 18 | | |
| GOES | | 1043 | 1130 | 1151 | | | | | | 68 | | C 3.9 | | | | | | 1.4E-02 |
| HOLL | | 1954 | 1954 | 2005 | N38 | E31 | 8545 | 05 | 21.3 | 11 | SF | | 3 | E | | 16 | | |
| RAMY | | 1957E | 1958U | 2007D | N39 | E30 | 8545 | 05 | 21.3 | 10D | SF | | 3 | E | | 21 | | |
| GOES | 19 | 1345 | 1349 | 1354 | | | | | | 9 | | C 1.1 | | | | | | 5.5E-04 |
| HOLL | | 1446 | 1448 | 1451 | N20 | W70 | 8541 | 05 | 14.3 | 5 | SF | | 3 | E | | 30 | | |
| GOES | | 1841 | 1852 | 1907 | | | | | | 26 | | C 1.2 | | | | | | 1.8E-03 |
| GOES | | 1957 | 2003 | 2019 | | | | | | 22 | | C 1.2 | | | | | | 1.5E-03 |
| GOES | | 2319 | 2323 | 2327 | | | | | | 8 | | C 1.0 | | | | | | 4.2E-04 |
| GOES | 20 | 0502 | 0508 | 0513 | | | | | | 11 | | C 2.3 | | | | | | 1.1E-03 |
| GOES | | 0856 | 0901 | 0906 | | | | | | 10 | | C 2.1 | | | | | | 9.5E-04 |
| GOES | | 1556 | 1559 | 1601 | | | | | | 5 | | B 8.1 | | | | | | 2.0E-04 |
| GOES | | 1725 | 1731 | 1737 | | | | | | 12 | | C 1.6 | | | | | | 9.2E-04 |
| HOLL | | 2029 | 2031 | 2033 | N26 | W64 | 8549 | 05 | 15.9 | 4 | SF | | 3 | E | | 26 | | |
| HOLL | | 2124 | 2125 | 2131 | N27 | W65 | 8549 | 05 | 15.8 | 7 | SF | | 3 | E | | 24 | | |
| HOLL | | 2224 | 2224 | 2228 | N27 | W65 | 8549 | 05 | 15.9 | 4 | SF | | 3 | E | | 19 | | |
| HOLL | | 2240 | 2241 | 2244 | N26 | W66 | 8549 | 05 | 15.8 | 4 | SF | | 3 | E | | 16 | | |
| HOLL | | 2256 | 2257 | 2301 | N26 | W66 | 8549 | 05 | 15.8 | 5 | SF | | 3 | E | | 17 | | |
| HOLL | | 2331 | 2331 | 2338 | N27 | W67 | 8549 | 05 | 15.7 | 7 | SF | | 3 | E | | 52 | | F |
| LEAR | 21 | 0224E | 0226U | 0233 | N26 | W66 | 8549 | 05 | 16.0 | 9D | SF | | 3 | E | | 20 | | |
| GOES | | 0456 | 0500 | 0502 | | | | | | 6 | | B 8.7 | | | | | | 2.6E-04 |
| LEAR | | 0507 | 0508 | 0512 | N24 | W70 | 8549 | 05 | 15.8 | 5 | SF | | 3 | E | | 39 | | |
| SVTO | | 0745 | 0747 | 0751 | N27 | W68 | 8549 | 05 | 16.0 | 6 | SF | | 3 | E | | 16 | | |
| LEAR | | 0746 | 0747 | 0801 | N27 | W68 | 8549 | 05 | 16.0 | 15 | SF | | 3 | E | | 29 | | |
| SVTO | | 0941 | 0942 | 0944 | N24 | W68 | 8549 | 05 | 16.1 | 3 | SF | | 3 | E | | 14 | | |
| SVTO | | 1107 | 1107 | 1120 | N26 | W71 | 8549 | 05 | 15.9 | 13 | SF | | 3 | E | | 11 | | |
| HOLL | | 1240E | 1241U | 1300 | N26 | W75 | 8549 | 05 | 15.7 | 20D | SF | | 3 | E | | 51 | | F |
| GOES | | 1249 | 1253 | 1255 | N26 | W75 | 8547 | | | 6 | SF | B 7.9 | | | | | | 2.4E-04 |
| SVTO | | 1426 | 1431 | 1438 | N27 | W68 | 8549 | 05 | 16.3 | 12 | SF | | 3 | E | | 15 | | |
| SVTO | | 1649 | 1649U | 1651D | N25 | W69 | 8549 | 05 | 16.3 | 2D | SF | | 2 | E | | 12 | | |
| GOES | | 1712 | 1949 | 2141 | | | | | | 269 | | C 2.4 | | | | | | 3.0E-02T |
| RAMY | | 1814 | 1815 | 1818 | N26 | W72 | 8549 | 05 | 16.2 | 4 | SN | | 3 | E | | 25 | | |
| HOLL | | 2316 | 2317 | 2321 | S13 | E55 | 8550 | 05 | 26.1 | 5 | SF | | 3 | E | | 26 | | |
| LEAR | 22 | 0318 | 0318 | 0322 | S14 | E53 | 8550 | 05 | 26.1 | 4 | SF | | 3 | E | | 31 | | |
| GOES | | 0647 | 0652 | 0656 | | | | | | 9 | | C 1.4 | | | | | | 5.4E-04 |
| LEAR | | 0743 | 0744 | 0753 | S19 | W40 | 8544 | 05 | 19.3 | 10 | SF | | 3 | E | | 13 | | |
| HOLL | | 1912 | 1912 | 1919 | N40 | W19 | 8545 | 05 | 21.2 | 7 | SF | | 3 | E | | 11 | | |
| GOES | 23 | 0238 | 0243 | 0246 | | | | | | 8 | | C 1.0 | | | | | | 4.3E-04 |
| LEAR | | 0317 | 0317 | 0323 | N41 | W25 | 8545 | 05 | 21.1 | 6 | SF | | 3 | E | | 13 | | |
| GOES | | 0456 | 0459 | 0501 | | | | | | 5 | | C 1.8 | | | | | | 4.5E-04 |
| GOES | | 0558 | 0602 | 0604 | | | | | | 6 | | C 1.2 | | | | | | 3.4E-04 |
| LEAR | | 0738 | 0739 | 0758 | N40 | W27 | 8545 | 05 | 21.1 | 20 | SF | | 4 | E | | 18 | | |
| LEAR | | 0801 | 0805 | 0822 | N36 | W27 | 8545 | 05 | 21.2 | 21 | SF | | 4 | E | | 18 | | |
| GOES | | 0804 | 0807 | 0809 | N36 | W27 | 8545 | | | 5 | SF | C 1.3 | | | | | | 3.4E-04 |
| RAMY | | 1030E | 1040 | 1107 | N30 | E40 | 8551 | 05 | 26.6 | 37D | SF | | 3 | E | | 50 | | F |
| GOES | | 1035 | 1043 | 1052 | N30 | E40 | 8551 | | | 17 | SF | C 1.8 | | | | | | 1.7E-03 |
| RAMY | | 1408 | 1412 | 1422 | S15 | E29 | 8550 | 05 | 25.8 | 14 | SF | | 3 | E | | 32 | | |
| GOES | | 1409 | 1415 | 1417 | S15 | E29 | 8550 | | | 8 | SF | C 1.3 | | | | | | 5.6E-04 |
| SVTO | | 1412 | 1414 | 1417 | S16 | E29 | 8550 | 05 | 25.8 | 5 | SF | | 3 | E | | 17 | | FH |
| GOES | | 1425 | 1440 | 1454 | N30 | E38 | 8551 | | | 29 | SF | C 3.4 | | | | | | 4.4E-03 |
| SVTO | | 1426 | 1439 | 1509 | N29 | E41 | 8551 | 05 | 26.8 | 43 | SF | | 3 | E | | 93 | | F |
| RAMY | | 1427 | 1438 | 1513 | N30 | E38 | 8551 | 05 | 26.6 | 46 | SF | | 3 | E | | 74 | | F |
| GOES | | 1728 | 1731 | 1733 | | | | | | 5 | | C 1.9 | | | | | | 4.2E-04 |
| GOES | | 2140 | 2143 | 2146 | | | | | | 6 | | B 9.3 | | | | | | 2.8E-04 |
| GOES | | 2304 | 2312 | 2325 | | | | | | 21 | | C 1.1 | | | | | | 1.3E-03 |
| SVTO | 24 | 0618 | 0619 | 0631 | N31 | E32 | 8551 | 05 | 26.8 | 13 | SF | | 3 | E | | 18 | | F |
| GOES | | 0644 | 0648 | 0651 | N31 | E32 | 8551 | | | 7 | SF | C 1.0 | | | | | | 4.0E-04 |
| GOES | | 0806 | 0813 | 0838 | N32 | E29 | 8551 | | | 32 | SF | C 1.6 | | | | | | 2.3E-03 |
| SVTO | | 0809E | 0810U | 0818D | N29 | E29 | 8551 | 05 | 26.6 | 9D | SF | | 3 | E | | 28 | | F |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEAR | 24 | 0810 | 0813 | 0817 | N32 | E29 | 8551 | 05 | 26.6 | 7 | SF | | 3 | E | | 15 | | E |
| GOES | | 0857 | 0901 | 0904 | N21 | E71 | 8552 | | | 7 | SF | C 1.7 | | | | | | 5.4E-04 |
| SVTO | | 0859 | 0902 | 0906 | N21 | E75 | 8552 | 05 | 30.1 | 7 | SF | | 3 | E | | 43 | | |
| LEAR | | 0900 | 0902 | 0905 | N21 | E71 | 8552 | 05 | 29.8 | 5 | SF | | 3 | E | | 21 | | |
| SVTO | | 0909 | 0913 | 0919 | N20 | E74 | 8552 | 05 | 30.0 | 10 | SF | | 3 | E | | 16 | | |
| SVTO | | 1004 | 1006 | 1011 | S13 | E17 | 8550 | 05 | 25.7 | 7 | SF | | 3 | E | | 16 | | |
| SVTO | | 1022 | 1023 | 1025 | N20 | E73 | 8552 | 05 | 30.0 | 3 | SF | | 3 | E | | 33 | | |
| GOES | | 1214 | 1219 | 1223 | | | | | | 9 | | C 1.0 | | | | | | 4.7E-04 |
| GOES | | 1325 | 1328 | 1331 | N33 | E30 | 8551 | | | 6 | SF | C 1.0 | | | | | | 3.0E-04 |
| SVTO | | 1328 | 1328 | 1333 | N33 | E30 | 8551 | 05 | 26.9 | 5 | SF | | 3 | E | | 29 | | |
| GOES | | 1349 | 1353 | 1357 | S14 | E15 | 8550 | | | 8 | SF | C 1.8 | | | | | | 7.1E-04 |
| SVTO | | 1351E | 1354U | 1403D | S14 | E15 | 8550 | 05 | 25.7 | 12D | SF | | 3 | E | | 46 | | F |
| GOES | | 1705 | 1714 | 1726 | N20 | E72 | 8552 | | | 21 | SF | C 3.3 | | | | | | 3.0E-03 |
| RAMY | | 1709 | 1711 | 1722 | N20 | E72 | 8552 | 05 | 30.2 | 13 | SF | | 3 | E | | 26 | | |
| SVTO | | 1711 | 1711U | 1718D | N19 | E68 | 8552 | 05 | 29.9 | 7D | SF | | 3 | E | | 13 | | |
| GOES | | 1735 | 1740 | 1743 | S13 | E16 | 8550 | | | 8 | SF | C 2.1 | | | | | | 7.8E-04 |
| RAMY | | 1741 | 1741 | 1756 | S13 | E16 | 8550 | 05 | 25.9 | 15 | SF | | 3 | E | | 47 | | |
| GOES | | 2323 | 2339 | 2346 | | | | | | 23 | | B 7.4 | | | | | | 9.1E-04 |
| SVTO | 25 | 0602 | 0604 | 0612 | S14 | E06 | 8550 | 05 | 25.7 | 10 | SF | | 3 | E | | 10 | | FH |
| SVTO | | 0707 | 0712 | 0716 | N24 | E69 | 8552 | 05 | 30.6 | 9 | SF | | 3 | E | | 13 | | |
| LEAR | | 0708 | 0710 | 0716 | N23 | E67 | 8552 | 05 | 30.4 | 8 | SF | | 4 | E | | 14 | | |
| GOES | | 0708 | 0710 | 0751 | N23 | E67 | 8552 | | | 43 | SF | C 1.1 | | | | | | |
| SVTO | | 0833 | 0834 | 0839 | S15 | E03 | 8550 | 05 | 25.6 | 6 | SF | | 3 | E | | 23 | | H |
| GOES | | 1029 | 1039 | 1051 | | | | | | 22 | | C 1.1 | | | | | | |
| SVTO | | 1238 | 1239 | 1241 | N18 | E62 | 8552 | 05 | 30.2 | 3 | SF | | 3 | E | | 16 | | |
| GOES | | 1255 | 1303 | 1320 | N21 | E58 | 8552 | | | 25 | SF | C 1.2 | | | | | | |
| RAMY | | 1300 | 1301 | 1307 | N21 | E58 | 8552 | 05 | 30.0 | 7 | SF | | 3 | E | | 15 | | |
| GOES | | 1633 | 1635 | 1644 | N37 | W53 | 8545 | | | 11 | SF | C 1.0 | | | | | | |
| GOES | | 1709 | 1722 | 1739 | S14 | E00 | | | | 30 | SF | C 1.6 | | | | | | 2.4E-03 |
| GOES | | 1801 | 1809 | 1820 | S20 | W54 | 8545 | | | 19 | SF | C 1.4 | | | | | | |
| GOES | | 2009 | 2016 | 2021 | N38 | W53 | | | | 12 | SF | C 2.5 | | | | | | 1.4E-03 |
| GOES | | 2127 | 2137 | 2221 | | | | | | 54 | | C 1.6 | | | | | | |
| HOLL | | 2249 | 2249 | 2252 | N38 | W55 | 8545 | 05 | 21.5 | 3 | SF | | 3 | E | | 19 | | |
| HOLL | | 2316 | 2316 | 2324 | S23 | W56 | 8548 | 05 | 21.6 | 8 | SF | | 3 | E | | 19 | | |
| HOLL | | 2356 | 2359 | 2405 | N38 | W57 | 8545 | 05 | 21.4 | 9 | SF | | 3 | E | | 16 | | |
| HOLL | 26 | 0007 | 0008 | 0014 | S15 | W03 | 8550 | 05 | 25.8 | 7 | SF | | 3 | E | | 19 | | F |
| HOLL | | 0016 | 0023 | 0027 | N39 | W57 | 8545 | 05 | 21.4 | 11 | SF | | 3 | E | | 36 | | F |
| LEAR | | 0016 | 0024 | 0028 | N40 | W52 | 8545 | 05 | 21.8 | 12 | SF | | 3 | E | | 45 | | |
| LEAR | | 0032 | 0036 | 0039 | N39 | W56 | 8545 | 05 | 21.5 | 7 | SF | | 3 | E | | 34 | | |
| GOES | | 0225 | 0230 | 0235 | N22 | E41 | 8554 | | | 10 | SF | C 2.3 | | | | | | 9.7E-04 |
| LEAR | | 0228 | 0229 | 0235 | N22 | E41 | 8554 | 05 | 29.2 | 7 | SF | | 4 | E | | 31 | | EH |
| GOES | | 0450 | 0522 | 0622 | S14 | W06 | 8550 | | | 92 | SF | C 2.7 | | | | | | 1.3E-02 |
| LEAR | | 0453 | 0455 | 0515 | S14 | W07 | 8550 | 05 | 25.7 | 22 | SF | | 3 | E | | 33 | | F |
| SVTO | | 0453 | 0457 | 0514 | S14 | W06 | 8550 | 05 | 25.8 | 21 | SF | | 3 | E | | 43 | | |
| LEAR | | 0822 | 0826 | 0830 | N40 | W61 | 8545 | 05 | 21.4 | 8 | SF | | 3 | E | | 16 | | |
| GOES | | 0853 | 0857 | 0859 | N18 | E46 | 8552 | | | 6 | SF | C 2.7 | | | | | | 6.9E-04 |
| LEAR | | 0855 | 0857 | 0907 | N18 | E46 | 8552 | 05 | 29.9 | 12 | SF | | 3 | E | | 43 | | |
| RAMY | | 1149 | 1149 | 1157 | N31 | E05 | 8551 | 05 | 26.9 | 8 | SF | | 3 | E | | 12 | | |
| RAMY | | 1405 | 1412 | 1418 | N19 | E44 | 8552 | 05 | 29.9 | 13 | SF | | 3 | E | | 19 | | |
| GOES | | 1409 | 1412 | 1414 | N19 | E44 | 8552 | | | 5 | SF | B 9.9 | | | | | | 2.6E-04 |
| HOLL | | 1410 | 1412 | 1415 | N18 | E44 | 8552 | 05 | 29.9 | 5 | SF | | 3 | E | | 15 | | |
| HOLL | | 1427 | 1428 | 1431 | N18 | E46 | 8552 | 05 | 30.1 | 4 | SF | | 3 | E | | 20 | | |
| SVTO | | 1549 | 1551 | 1605 | N16 | E49 | 8552 | 05 | 30.4 | 16 | SF | | 3 | E | | 12 | | F |
| RAMY | | 1550 | 1550 | 1604 | N19 | E48 | 8552 | 05 | 30.3 | 14 | SF | | 3 | E | | 13 | | F |
| HOLL | | 1556 | 1611 | 1615 | N19 | E50 | 8552 | 05 | 30.5 | 19 | SF | | 3 | E | | 70 | | |
| SVTO | | 1609 | 1610 | 1615 | N17 | E45 | 8552 | 05 | 30.1 | 6 | SF | | 3 | E | | 57 | | |
| RAMY | | 1609 | 1610 | 1616 | N18 | E44 | 8552 | 05 | 30.0 | 7 | SF | | 3 | E | | 65 | | F |
| RAMY | | 1745 | 1747 | 1813 | N24 | E27 | 8554 | 05 | 28.8 | 28 | SF | | 3 | E | | 15 | | |
| HOLL | | 1754 | 1756 | 1812 | N25 | E30 | 8554 | 05 | 29.1 | 18 | SF | | 3 | E | | 12 | | |
| GOES | | 1857 | 1901 | 1906 | S20 | W93 | 8544 | | | 9 | SF | B 9.7 | | | | | | 4.5E-04 |
| HOLL | | 1900 | 1901 | 1903 | S20 | W93 | 8544 | 05 | 19.7 | 3 | SF | | 3 | E | | 82 | | |
| RAMY | | 1908 | 1912 | 1915 | N24 | E26 | 8554 | 05 | 28.8 | 7 | SF | | 3 | E | | 11 | | |
| GOES | | 1915 | 1932 | 1945 | N17 | E46 | | | | 30 | 2N | M 1.2 | | | | | | 1.3E-02 |
| RAMY | | 1917 | 1921 | 2026 | N17 | E46 | 8552 | 05 | 30.3 | 69 | 2N | | 3 | E | | 316 | | UF |
| GOES | | 2144 | 2153 | 2158 | | | | | | 14 | | C 2.1 | | | | | | 1.3E-03 |
| GOES | 27 | 0004 | 0014 | 0028 | | | | | | 24 | | C 1.5 | | | | | | 1.8E-03 |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | Obs See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEAR | 27 | 0113 | 0116 | 0122 | N18 | E40 | 8552 | 05 | 30.1 | 9 | SF | | 3 | E | | 10 | | F |
| GOES | | 0530 | 0534 | 0539 | N24 | E21 | 8554 | | | 9 | SF | C 2.9 | | | | | | 1.1E-03 |
| SVTO | | 0533 | 0536 | 0555 | N24 | E21 | 8554 | 05 | 28.8 | 22 | SF | | 3 | E | | 60 | | F |
| GOES | | 0913 | 0917 | 0920 | | | | | | 7 | | C 1.2 | | | | | | 4.0E-04 |
| SVTO | | 0923 | 0925 | 0930 | N31 | W07 | 8551 | 05 | 26.8 | 7 | SF | | 3 | E | | 16 | | F |
| RAMY | | 1106E | 1107U | 1112D | N19 | E31 | 8552 | 05 | 29.8 | 6D | SF | | 3 | E | | 27 | | F |
| GOES | | 1136 | 1143 | 1154 | S30 | E78 | | | | 18 | SF | C 4.5 | | | | | | 3.4E-03 |
| RAMY | | 1140 | 1140 | 1147 | S30 | E78 | | 06 | 2.6 | 7 | SF | | 3 | E | | 18 | | |
| SVTO | | 1141 | 1142 | 1147 | S31 | E77 | | 06 | 2.6 | 6 | SF | | 3 | E | | 25 | | |
| GOES | | 1259 | 1304 | 1309 | N18 | E31 | 8552 | | | 10 | 1F | C 3.4 | | | | | | 1.6E-03 |
| SVTO | | 1302 | 1302 | 1313 | N18 | E32 | 8552 | 05 | 30.0 | 11 | SN | | 3 | E | | 83 | | F |
| HOLL | | 1302 | 1303 | 1314 | N18 | E31 | 8552 | 05 | 29.9 | 12 | 1F | | 3 | E | | 157 | | |
| RAMY | | 1417 | 1417 | 1423 | S22 | W76 | 8548 | 05 | 21.7 | 6 | SF | | 3 | E | | 17 | | |
| SVTO | | 1417 | 1418 | 1423 | S21 | W80 | 8548 | 05 | 21.5 | 6 | SF | | 3 | E | | 11 | | |
| GOES | | 1423 | 1440 | 1505 | S22 | W76 | 8548 | | | 42 | SF | C 2.7 | | | | | | 5.9E-03 |
| RAMY | | 1426 | 1433 | 1436 | N24 | E15 | 8554 | 05 | 28.8 | 10 | SF | | 3 | E | | 17 | | |
| SVTO | | 1428 | 1429 | 1440 | S29 | E76 | | 06 | 2.6 | 12 | SF | | 3 | E | | 12 | | |
| RAMY | | 1432 | 1435 | 1440 | N21 | E73 | | 06 | 2.2 | 8 | SF | | 3 | E | | 20 | | H |
| HOLL | | 1451 | 1452 | 1454 | N20 | E73 | | 06 | 2.2 | 3 | SF | | 3 | E | | 38 | | |
| HOLL | | 1451 | 1453 | 1457 | N24 | E14 | 8554 | 05 | 28.7 | 6 | SF | | 3 | E | | 13 | | |
| GOES | | 1515 | 1535 | 1603 | | | 8557 | | | 48 | | C 6.2 | | | | | | 1.4E-02 |
| HOLL | | 1526 | 1528 | 1529 | N17 | E27 | 8552 | 05 | 29.7 | 3 | SF | | 3 | E | | 11 | | |
| RAMY | | 1528 | 1534 | 1606 | S24 | E81 | 8557 | 06 | 2.9 | 38 | SF | | 3 | E | | 41 | | F |
| SVTO | | 1535 | 1537 | 1538 | S21 | W81 | 8548 | 05 | 21.4 | 3 | SF | | 3 | E | | 16 | | |
| SVTO | | 1549 | 1549 | 1602 | S29 | E75 | 8557 | 06 | 2.5 | 13 | SF | | 3 | E | | 17 | | |
| HOLL | | 1556 | 1559 | 1610 | S26 | E81 | | 06 | 2.9 | 14 | SF | | 3 | E | | 33 | | F |
| RAMY | | 1637 | 1653 | 1741 | N24 | E34 | 8552 | 05 | 30.3 | 64 | 1N | | 3 | E | | 190 | | H |
| HOLL | | 1639 | 1652 | 1739 | N24 | E34 | 8552 | 05 | 30.3 | 60 | 1F | | 3 | E | | 114 | | |
| SVTO | | 1640 | 1653 | 1736D | N24 | E34 | 8552 | 05 | 30.3 | 56D | 1N | | 3 | E | | 101 | | FH |
| RAMY | | 1647 | 1647 | 1652 | N38 | W76 | 8545 | 05 | 21.5 | 5 | SF | | 3 | E | | 26 | | |
| GOES | | 1649 | 1659 | 1708 | N38 | W76 | 8545 | | | 19 | SF | C 7.4 | | | | | | 7.6E-03 |
| GOES | | 1833 | 1859 | 1913 | N17 | E29 | 8552 | | | 40 | SF | C 2.3 | | | | | | 5.0E-03 |
| HOLL | | 1837 | 1840 | 1842 | N17 | E30 | 8552 | 05 | 30.0 | 5 | SF | | 3 | E | | 18 | | |
| HOLL | | 1844 | 1847 | 1855 | N17 | E29 | 8552 | 05 | 30.0 | 11 | SF | | 3 | E | | 16 | | |
| HOLL | | 2146 | 2148 | 2153 | N24 | E40 | 8552 | 05 | 31.0 | 7 | SF | | 3 | E | | 26 | | |
| HOLL | | 2235 | 2249 | 2254 | N18 | E22 | 8552 | 05 | 29.6 | 19 | SF | | 3 | E | | 13 | | |
| GOES | 28 | 0549 | 0553 | 0558 | N12 | E81 | | | | 9 | SF | C 2.3 | | | | | | 8.9E-04 |
| SVTO | | 0551 | 0552 | 0602 | N12 | E81 | | 06 | 3.3 | 11 | SF | | 3 | E | | 57 | | H |
| GOES | | 0823 | 0831 | 0840 | | | | | | 17 | | C 1.2 | | | | | | 1.1E-03 |
| SVTO | | 0925 | 0928 | 0940 | N26 | E10 | 8554 | 05 | 29.2 | 15 | SF | | 3 | E | | 16 | | |
| GOES | | 1130 | 1213 | 1242 | S28 | E63 | 8557 | | | 72 | SF | C 2.1 | | | | | | 7.2E-03 |
| RAMY | | 1157 | 1212 | 1228 | S28 | E63 | 8557 | 06 | 2.4 | 31 | SF | | 3 | E | | 18 | | |
| SVTO | | 1210 | 1217 | 1226 | S28 | E64 | 8557 | 06 | 2.5 | 16 | SF | | 3 | E | | 23 | | |
| GOES | | 1412 | 1416 | 1421 | N39 | W82 | 8545 | | | 9 | SF | C 1.3 | | | | | | 6.7E-04 |
| RAMY | | 1417 | 1417 | 1420 | N39 | W82 | 8545 | 05 | 21.9 | 3 | SF | | 3 | E | | 33 | | |
| SVTO | | 1642 | 1643 | 1647 | S30 | E64 | 8557 | 06 | 2.7 | 5 | SF | | 3 | E | | 21 | | |
| RAMY | | 1724 | 1724 | 1727 | S29 | E64 | 8557 | 06 | 2.7 | 3 | SF | | 3 | E | | 17 | | |
| RAMY | | 1813 | 1813 | 1816 | S29 | E62 | 8557 | 06 | 2.6 | 3 | SF | | 3 | E | | 20 | | |
| GOES | | 2226 | 2232 | 2236 | | | | | | 10 | | C 1.7 | | | | | | 6.8E-04 |
| GOES | | 2239 | 2244 | 2304 | | | | | | 25 | | C 1.2 | | | | | | 1.6E-03 |
| GOES | 29 | 0304 | 0315 | 0327 | | | | | | 23 | | M 1.6 | | | | | | 1.5E-02 |
| SVTO | | 0529 | 0529 | 0544 | S26 | E55 | 8557 | 06 | 2.5 | 15 | SF | | 3 | E | | 17 | | F |
| SVTO | | 0915 | 0915 | 0919 | N24 | W03 | 8554 | 05 | 29.1 | 4 | SF | | 3 | E | | 10 | | |
| GOES | | 0928 | 0934 | 0942 | | | | | | 14 | | C 1.1 | | | | | | 7.9E-04 |
| RAMY | | 1304 | 1306 | 1310 | N20 | E05 | 8559 | 05 | 29.9 | 6 | SF | | 3 | E | | 26 | | |
| SVTO | | 1304 | 1307 | 1309 | N19 | E05 | 8552 | 05 | 29.9 | 5 | SF | | 3 | E | | 12 | | |
| RAMY | | 1324 | 1325 | 1330 | N14 | E62 | 8558 | 06 | 3.2 | 6 | SF | | 3 | E | | 11 | | |
| GOES | | 1615 | 1620 | 1623 | N25 | W06 | 8554 | | | 8 | SF | B 7.9 | | | | | | 3.2E-04 |
| RAMY | | 1617 | 1618 | 1628 | N25 | W07 | 8554 | 05 | 29.1 | 11 | SF | | 3 | E | | 30 | | |
| HOLL | | 1617 | 1618 | 1629 | N25 | W06 | 8554 | 05 | 29.2 | 12 | SF | | 3 | E | | 35 | | |
| SVTO | | 1618 | 1620 | 1626 | N25 | W07 | 8554 | 05 | 29.1 | 8 | SF | | 3 | E | | 21 | | F |
| GOES | | 2004 | 2009 | 2013 | N24 | W13 | 8554 | | | 9 | SF | C 2.3 | | | | | | 7.5E-04 |
| HOLL | | 2007 | 2009 | 2017 | N24 | W13 | 8554 | 05 | 28.8 | 10 | SF | | 3 | E | | 64 | | |
| RAMY | | 2008E | 2010U | 2024 | N24 | W12 | 8554 | 05 | 28.9 | 16D | SF | | 3 | E | | 33 | | H |
| RAMY | | 2038E | 2039U | 2042 | N19 | E60 | 8560 | 06 | 3.4 | 4D | SF | | 3 | E | | 16 | | |
| HOLL | | 2038 | 2040 | 2043 | S18 | E58 | 8560 | 06 | 3.3 | 5 | SF | | 3 | E | | 47 | | |

# Hα SOLAR FLARES

## MAY 1999

| Sta | Day | Start (UT) | Max (UT) | End (UT) | Lat | CMD | NOAA/ USAF Region | CMP Mo | CMP Day | Dur (Min) | Imp Opt | Imp Xray | Imp See | Obs Type | Area Measurement Time (UT) | Area Measurement Apparent (10-6 Disk) | Area Measurement Corr (Sq Deg) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GOES | 29 | 2315 | 2318 | 2320 | | | | | | 5 | | B 7.3 | | | | | | 1.7E-04 |
| GOES | 30 | 0249 | 0338 | 0426 | | | | | | 97 | | C 1.8 | | | | | | 7.2E-03 |
| SVTO | | 0427E | 0427U | 0441 | N15 | E53 | 8558 | 06 | 3.2 | 14D | SF | | 3 | E | | 68 | | H |
| GOES | | 0605 | 0612 | 0623 | N31 | W43 | 8551 | | | 18 | SF | C 1.1 | | | | | | 1.1E-03 |
| SVTO | | 0620 | 0621 | 0624 | N31 | W43 | 8551 | 05 | 26.9 | 4 | SF | | 3 | E | | 39 | | |
| GOES | | 0634 | 0643 | 0654 | | | | | | 20 | | C 1.1 | | | | | | 1.2E-03 |
| GOES | | 1025 | 1155 | 1320 | | | | | | 175 | | C 1.1 | | | | | | 9.2E-03 |
| RAMY | | 1152E | 1153U | 1203D | N15 | E52 | 8558 | 06 | 3.4 | 11D | SF | | 3 | E | | 16 | | |
| SVTO | | 1152 | 1156 | 1214 | N15 | E51 | 8558 | 06 | 3.3 | 22 | SF | | 3 | E | | 23 | | H |
| HOLL | | 1323 | 1326 | 1338 | N17 | E47 | 8558 | 06 | 3.1 | 15 | SF | | 3 | E | | 26 | | |
| HOLL | | 1623 | 1627 | 1640 | N16 | E49 | 8558 | 06 | 3.4 | 17 | SF | | 3 | E | | 11 | | |
| GOES | | 1814 | 1824 | 1831 | | | 8552 | | | 17 | | C 1.0 | | | | | | 8.8E-04 |
| RAMY | | 1816 | 1821 | 1833 | N16 | E45 | 8558 | 06 | 3.2 | 17 | SF | | 3 | E | | 25 | | |
| RAMY | | 1818 | 1822 | 1835 | N17 | W18 | 8552 | 05 | 29.4 | 17 | SF | | 3 | E | | 19 | | |
| GOES | | 1912 | 1916 | 1921 | N15 | E44 | 8558 | | | 9 | SF | C 1.2 | | | | | | 5.7E-04 |
| RAMY | | 1914 | 1917 | 1925 | N13 | E46 | 8558 | 06 | 3.3 | 11 | SF | | 3 | E | | 31 | | |
| HOLL | | 1921 | 1924 | 1926 | N15 | E44 | 8558 | 06 | 3.1 | 5 | SF | | 3 | E | | 29 | | |
| GOES | | 2331 | 2345 | 2354 | | | | | | 23 | | C 8.7 | | | | | | 6.9E-03 |
| GOES | 31 | 0802 | 0810 | 0819 | S24 | E30 | 8560 | | | 17 | SF | C 4.8 | | | | | | 3.2E-03 |
| SVTO | | 0808 | 0814 | 0823 | S24 | E30 | 8560 | 06 | 2.6 | 15 | SF | | 3 | E | | 46 | | |
| GOES | | 0933 | 0940 | 0945 | N19 | W26 | 8552 | | | 12 | SF | C 2.8 | | | | | | 1.4E-03 |
| SVTO | | 0936 | 0937 | 0949 | N19 | W26 | 8552 | 05 | 29.4 | 13 | SF | | 3 | E | | 67 | | F |
| GOES | | 1058 | 1107 | 1110 | | | | | | 12 | | C 1.7 | | | | | | 7.9E-04 |
| GOES | | 1201 | 1205 | 1210 | S15 | E31 | | | | 9 | SF | C 1.1 | | | | | | 5.0E-04 |
| RAMY | | 1202 | 1205 | 1212 | S15 | E31 | | 06 | 2.8 | 10 | SF | | 3 | E | | 14 | | |
| HOLL | | 1421 | 1443 | 1458 | S19 | E29 | 8560 | 06 | 2.8 | 37 | SF | | 3 | E | | 28 | | |
| GOES | | 1544 | 1547 | 1551 | | | | | | 7 | | B 6.4 | | | | | | 2.4E-04 |
| RAMY | | 1627 | 1631 | 1640 | S15 | E26 | 8562 | 06 | 2.6 | 13 | SF | | 3 | E | | 24 | | |
| GOES | | 1700 | 1706 | 1713 | S14 | E26 | 8562 | | | 13 | SF | C 1.0 | | | | | | 6.9E-04 |
| HOLL | | 1702 | 1702 | 1715 | S14 | E26 | | 06 | 2.7 | 13 | SF | | 3 | E | | 29 | | |
| SVTO | | 1702 | 1703 | 1709 | S15 | E26 | 8562 | 06 | 2.7 | 7 | SF | | 2 | E | | 13 | | |
| HOLL | | 1849 | 1852 | 1857 | S19 | E27 | 8560 | 06 | 2.8 | 8 | SF | | 3 | E | | 46 | | |
| HOLL | | 1859 | 1859 | 1903 | S24 | E29 | 8560 | 06 | 3.0 | 4 | SF | | 3 | E | | 19 | | |
| GOES | | 2021 | 2026 | 2030 | S14 | E24 | 8562 | | | 9 | SF | C 1.3 | | | | | | 6.3E-04 |
| HOLL | | 2023 | 2029 | 2037 | S14 | E24 | 8562 | 06 | 2.7 | 14 | SF | | 3 | E | | 41 | | |

"Remarks"

A = Eruptive prominence whose base is less than 90 degrees from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by high-speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the H and K lines of Ca II.
P = Flare shows Helium D3 in emission.
Q = Flare shows Balmer continuum in emission.
R = Marked asymmetry in H-alpha line suggests ejection of high-velocity material.
S = Brightness follows disappearance of filament in same position.
T = Region active all day.
U = Two bright branches, parallel or converging.
V = Occurrence of an explosive phase; important, expansion within roughly 1 minute that often includes a significant intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide H-alpha line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

Observation Type: C=Cinematographic, E=Electronic, P=Photographic, V=Visual

NOTE: Beginning July 1997, the times of all GOES X-ray events are now included in this table.

# S O L A R  R A D I O  E M I S S I O N



## Selected Fixed Frequency Events

MAY 1999

| Day | Freq | Sta | Type | | Start (UT) | Time of Maximum (UT) | Duration (Min) | Flux Density Peak (10 -22 W/m 2 Hz) | Flux Density Mean (10 -22 W/m 2 Hz) | Int | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 03 | 2695 | SVTO | 20 | GRF | 0540.0 | 0548.0 | 50.0 | 220.0 | | | QL=4 ST=3 TYP=2 |
| | 2695 | LEAR | 48 | C | 0540.0 | 0548.0 | 81.0 | 180.0 | | | QL=2 ST=2 TYP=8 |
| | 8800 | SVTO | 20 | GRF | 0543.0 | 0607.0 | 62.0 | 85.0 | | | QL=4 ST=2 TYP=2 |
| | 8800 | LEAR | 20 | GRF | 0544.0 | 0607.0 | 84.0 | 91.0 | | | QL=2 ST=2 TYP=2 |
| | 2695 | PALE | 8 | S | 2309.0 | 2310.0 | 2.0 | 78.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | PALE | 8 | S | 2309.0 | 2310.0 | 2.0 | 160.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | LEAR | 8 | S | 2310.0 | 2310.0 | 1.0 | 62.0 | | | QL=2 ST=2 TYP=3 |
| | 8800 | LEAR | 8 | S | 2310.0 | 2310.0 | U | 130.0 | | | QL=2 ST=2 TYP=3 |
| 07 | 8800 | LEAR | 4 | S/F | 0434.0 | 0436.0 | 6.0 | 170.0 | | | QL=2 ST=2 TYP=3 |
| | 8800 | SVTO | 4 | S/F | 0434.0 | 0436.0 | 6.0 | 150.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | SVTO | 8 | S | 1426.0 | 1426.0 | 2.0 | 37.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | SGMR | 4 | S/F | 1426.0 | 1426.0 | 26.0 | 38.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SGMR | 20 | GRF | 1427.0 | 1434.0 | 44.0 | 34.0 | | | QL=4 ST=2 TYP=2 |
| 08 | 2695 | SGMR | 4 | S/F | 1050.0 | 1051.0 | 4.0 | 32.0 | | | QL=4 ST=3 TYP=3 |
| | 8800 | SGMR | 4 | S/F | 1050.0 | 1051.0 | 4.0 | 280.0 | | | QL=4 ST=3 TYP=3 |
| | 8800 | SVTO | 4 | S/F | 1050.0 | 1051.0 | 4.0 | 330.0 | | | QL=4 ST=3 TYP=3 |
| | 2695 | SVTO | 8 | S | 1051.0 | 1051.0 | U | 30.0 | | | QL=4 ST=3 TYP=3 |
| | 2695 | SVTO | 4 | S/F | 1423.0 | 1424.0 | 5.0 | 85.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | SGMR | 4 | S/F | 1423.0 | 1424.0 | 11.0 | 90.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SVTO | 4 | S/F | 1423.0 | 1424.0 | 22.0 | 230.0 | | | QL=4 ST=2 TYP=3 |
| 09 | 8800 | PALE | 4 | S/F | 1756.0 | 1757.0 | 6.0 | 370.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SGMR | 4 | S/F | 1756.0 | 1757.0 | 6.0 | 490.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | PALE | 4 | S/F | 1757.0 | 1759.0 | 4.0 | 160.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | SGMR | 4 | S/F | 1757.0 | 1759.0 | 4.0 | 150.0 | | | QL=4 ST=2 TYP=3 |
| 10 | 2695 | SVTO | 4 | S/F | 0525.0 | 0527.0 | 4.0 | 85.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | LEAR | 4 | S/F | 0526.0 | 0527.0 | 3.0 | 63.0 | | | QL=2 ST=2 TYP=3 |
| | 8800 | SVTO | 4 | S/F | 0526.0 | 0527.0 | 8.0 | 40.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | LEAR | 4 | S/F | 0526.0 | 0527.0 | 10.0 | 31.0 | | | QL=2 ST=2 TYP=3 |
| 11 | 8800 | SGMR | 8 | S | 1131.0 | 1131.0 | U | 330.0 | | | QL=4 ST=3 TYP=3 |
| | 8800 | PALE | 8 | S | 2214.0 | 2214.0 | U | 23.0 | | | QL=4 ST=2 TYP=3 |
| 16 | 8800 | SGMR | 8 | S | 1348.0 | 1349.0 | 2.0 | 150.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SVTO | 8 | S | 1349.0 | 1349.0 | U | 130.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | PALE | 8 | S | 1723.0 | 1723.0 | 1.0 | 120.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | PALE | 8 | S | 1723.0 | 1723.0 | 1.0 | 110.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | SGMR | 8 | S | 1723.0 | 1723.0 | 1.0 | 120.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SGMR | 8 | S | 1723.0 | 1723.0 | 1.0 | 130.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SVTO | 8 | S | 1723.0 | 1723.0 | 1.0 | 130.0 | | | QL=2 ST=2 TYP=3 |
| | 2695 | SVTO | 8 | S | 1723.0 | 1723.0 | 1.0 | 110.0 | | | QL=2 ST=2 TYP=3 |
| | 8800 | SGMR | 8 | S | 2232.0 | 2233.0 | 1.0 | 59.0 | | | QL=4 ST=2 TYP=3 |
| 17 | 8800 | LEAR | 4 | S/F | 0453.0 | 0453.0 | 3.0 | 200.0 | | | QL=2 ST=2 TYP=3 |
| | 2695 | LEAR | 8 | S | 0453.0 | 0453.0 | 1.0 | 65.0 | | | QL=2 ST=2 TYP=3 |
| | 2695 | SVTO | 8 | S | 0453.0 | 0453.0 | 2.0 | 69.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SVTO | 8 | S | 0453.0 | 0453.0 | 2.0 | 160.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SVTO | 4 | S/F | 1702.0 | 1705.0 | 7.0 | 59.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SGMR | 4 | S/F | 1703.0 | 1705.0 | 4.0 | 110.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | PALE | 8 | S | 2003.0 | 2003.0 | 1.0 | 84.0 | | | QL=4 ST=2 TYP=3 |
| 18 | 8800 | SVTO | 8 | S | 0714.0 | 0714.0 | 1.0 | 72.0 | | | QL=4 ST=2 TYP=3 |
| 23 | 2695 | SVTO | 8 | S | 1725.0 | 1725.0 | U | 32.0 | | | QL=4 ST=2 TYP=3 |
| 24 | 2695 | SVTO | 8 | S | 0424.0 | 0424.0 | U | 60.0 | | | QL=4 ST=2 TYP=3 |
| 27 | 8800 | SVTO | 8 | S | 0532.0 | 0533.0 | 1.0 | 50.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | SVTO | 49 | GB | 0931.0 | 0933.0 | 4.0 | 16000.0 | | | QL=4 ST=2 TYP=6 |
| | 2695 | PALE | 20 | GRF | 1639.0 | 1646.0 | 17.0 | 58.0 | | | QL=4 ST=2 TYP=2 |
| | 2695 | SVTO | 4 | S/F | 1643.0 | 1644.0 | 10.0 | 24.0 | | | QL=4 ST=2 TYP=3 |
| 29 | 2695 | LEAR | 4 | S/F | 0307.0 | 0311.0 | 13.0 | 120.0 | | | QL=2 ST=2 TYP=3 |
| | 8800 | PALE | 4 | S/F | 0308.0 | 0310.0 | 8.0 | 200.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | LEAR | 4 | S/F | 0308.0 | 0310.0 | 14.0 | 300.0 | | | QL=2 ST=2 TYP=3 |
| | 2695 | PALE | 4 | S/F | 0308.0 | 0311.0 | 12.0 | 110.0 | | | QL=4 ST=2 TYP=3 |

# S O L A R  R A D I O  E M I S S I O N
## Selected Fixed Frequency Events

### MAY 1999

| Day | Freq | Sta | Type | Start (UT) | Time of Maximum (UT) | Duration (Min) | Flux Density Peak (10 -22 W/m 2 Hz) | Flux Density Mean (10 -22 W/m 2 Hz) | Int | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 29 | 8800 | PALE | 8 S | 2007.0 | 2008.0 | 2.0 | 43.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | PALE | 8 S | 2007.0 | 2008.0 | 1.0 | 33.0 | | | QL=4 ST=2 TYP=3 |
| | 8800 | SGMR | 8 S | 2007.0 | 2008.0 | 2.0 | 46.0 | | | QL=4 ST=2 TYP=3 |
| | 2695 | SGMR | 8 S | 2007.0 | 2008.0 | 1.0 | 35.0 | | | QL=4 ST=2 TYP=3 |

Reports are received routinely from the following observatories:
LEAR = Learmonth  PALE = Palehua  SGMR = Sagamore Hill  SVTO = San Vito

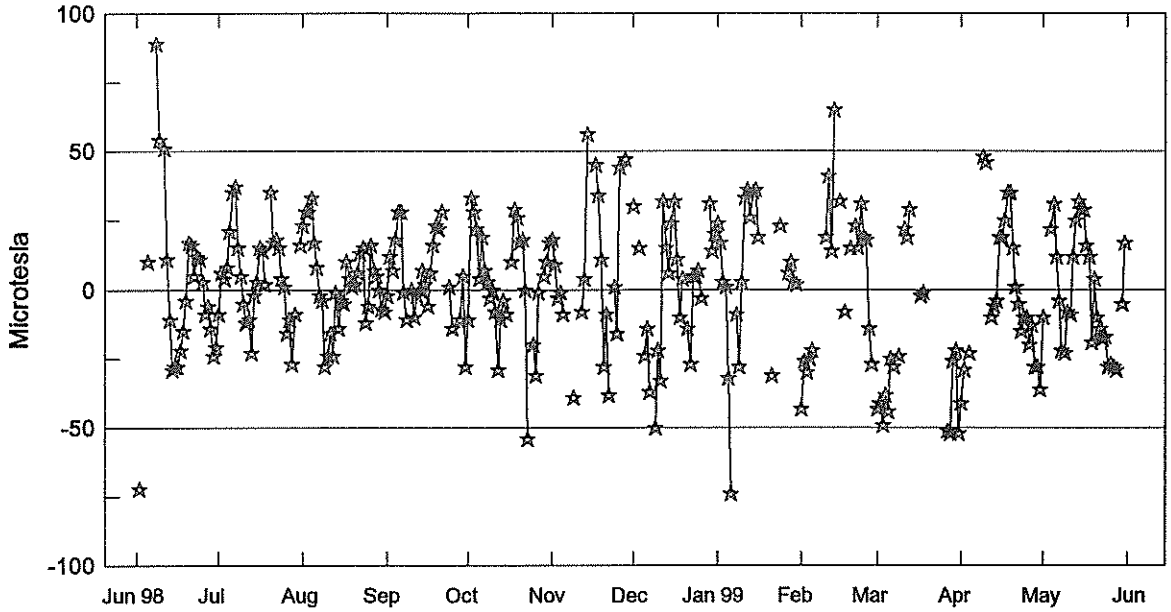
Explanation of Type Code:

| | | | | |
|---|---|---|---|---|
| 1 Simple 1 | 7 Minor + | 24 Rise | 30 Post Burst Increase A | 43 Onset of Noise Storm |
| 2 Simple 1F | 8 Spike | 25 Rise A | 31 Post Burst Decrease | 44 Noise Storm in Progress |
| 3 Simple 2 | 20 Simple 3 | 26 Fall | 33 Absorption | 45 Complex |
| 4 Simple 2F | 21 Simple 3A | 27 Rise and Fall | 40 Fluctuation | 46 Complex F |
| 5 Simple | 22 Simple 3F | 28 Precusor | 41 Group of Bursts | 47 Great Burst |
| 6 Minor | 23 Simple 3AF | 29 Post Burst Increase | 42 Series of Bursts | 48 Major |

| | | | |
|---|---|---|---|
| 1A Simple 1A | 4A Simple 2AF | 24PF Post Rise F | 27F Rise and Fall F |
| 3A Simple 2A | 4O Rise Only | 16A Fall A | 27AF Rise and Fall AF |
| 21A Simple 3A GRF | 4OF Rise Only F | 26O Fall Only | 31A Post Burst Decrease A |
| 2A Simple 1AF | 4P Post Rise | 26F Fall F | 32A Absorption A |

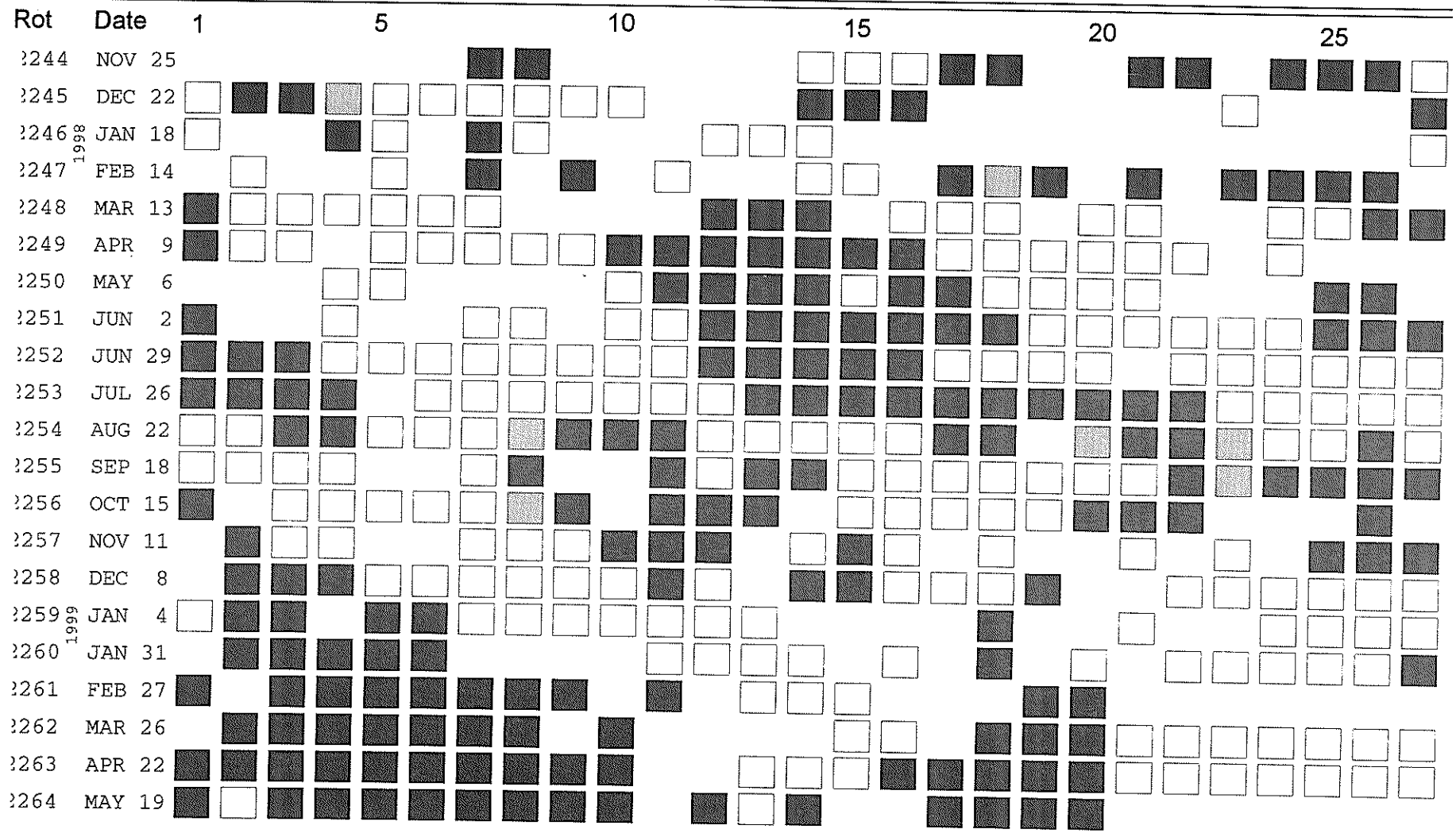
RSTN Site Information: Beginning in April 1986, the RSTN sites LEAR, PALE, SGMR, and SVTO fixed frequency solar radio data are periodically adjusted to several world standard stations. These world standard stations include: Kislovodsk, USSR 15,500 MHz; Penticton, Canada 2800 MHz; and Hiraiso, Japan 500 and 200 MHz.

# Stanford Mean Solar Magnetic Field (Microtesla)
## "Sun-As-A-Star"




| Day | Jun 98 | Jul | Aug | Sep | Oct | Nov | Dec | Jan 99 | Feb | Mar | Apr | May |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | --- | -9 | 23 | -2 | -11 | 18 | 30 | 24 | -43 | -43 | -41 | -10 |
| 2 | -72 | 6 | 28 | 12 | 33 | 9 | --- | 17 | -26 | -41 | -29 | --- |
| 3 | --- | 4 | 28 | 7 | 28 | -3 | 15 | 3 | -30 | -49 | --- | --- |
| 4 | --- | 8 | 33 | 18 | 22 | -1 | --- | 1 | -25 | -38 | -23 | 22 |
| 5 | 10 | 21 | 17 | 28 | 4 | -9 | -24 | -32 | -22 | -44 | --- | 31 |
| 6 | --- | 35 | 8 | 28 | 19 | --- | -14 | -74 | --- | -25 | --- | 12 |
| 7 | --- | 37 | -2 | -1 | 7 | --- | -37 | --- | --- | -28 | --- | -4 |
| 8 | 89 | 15 | -4 | -11 | 3 | --- | --- | -9 | --- | --- | --- | -22 |
| 9 | 54 | 5 | -28 | --- | -3 | -39 | -50 | -28 | --- | -24 | 48 | -23 |
| 10 | --- | -5 | -24 | 0 | 0 | --- | -22 | 3 | 19 | --- | 46 | -8 |
| 11 | 51 | -12 | -16 | -10 | -8 | --- | -33 | 33 | 41 | 22 | --- | -9 |
| 12 | 11 | -11 | -24 | -2 | -29 | -8 | 32 | 36 | 14 | 19 | -10 | 12 |
| 13 | -11 | -23 | -1 | 0 | -11 | 4 | 15 | 26 | 65 | 29 | -6 | 25 |
| 14 | -29 | -2 | -14 | 7 | -4 | 56 | 6 | 35 | --- | --- | -4 | 32 |
| 15 | -28 | 3 | -4 | 2 | -9 | --- | 24 | 36 | 32 | --- | 19 | 29 |
| 16 | -28 | 15 | -5 | -6 | --- | --- | 32 | 19 | --- | --- | 19 | 29 |
| 17 | -22 | 14 | 10 | 6 | 10 | 45 | 11 | --- | -8 | -2 | 25 | 16 |
| 18 | -15 | 2 | 4 | 16 | 29 | 34 | -10 | --- | --- | -1 | 35 | 12 |
| 19 | -4 | --- | 1 | 23 | 26 | 11 | 4 | --- | 15 | --- | 35 | -19 |
| 20 | 17 | 35 | 2 | 22 | 17 | -28 | --- | --- | --- | --- | 15 | 4 |
| 21 | 16 | 17 | 6 | 28 | 18 | -9 | -14 | -31 | 23 | --- | 1 | -10 |
| 22 | 5 | 18 | 13 | --- | 0 | -38 | -27 | --- | 15 | --- | -5 | -14 |
| 23 | 12 | 15 | 15 | --- | -54 | --- | 5 | --- | 31 | --- | -15 | -18 |
| 24 | 11 | 4 | -12 | 1 | --- | 1 | 5 | 23 | 19 | --- | -10 | -17 |
| 25 | 3 | 1 | -6 | -14 | -20 | -16 | 7 | --- | 18 | --- | -10 | -28 |
| 26 | -9 | -16 | 16 | --- | -31 | 44 | -3 | --- | -14 | --- | -20 | -27 |
| 27 | -6 | -11 | 7 | --- | -1 | --- | --- | 6 | -27 | -51 | -13 | -28 |
| 28 | -14 | -27 | 5 | -11 | --- | 47 | --- | 10 | --- | -52 | -28 | -29 |
| 29 | -24 | -9 | 0 | 5 | 5 | --- | 31 | 3 | | -26 | -28 | --- |
| 30 | -21 | --- | -7 | -28 | 10 | --- | 14 | 2 | | -22 | -36 | -5 |
| 31 | | 16 | -8 | | 17 | | 20 | --- | | -52 | | 17 |

# STANFORD MEAN SOLAR MAGNETIC FIELD

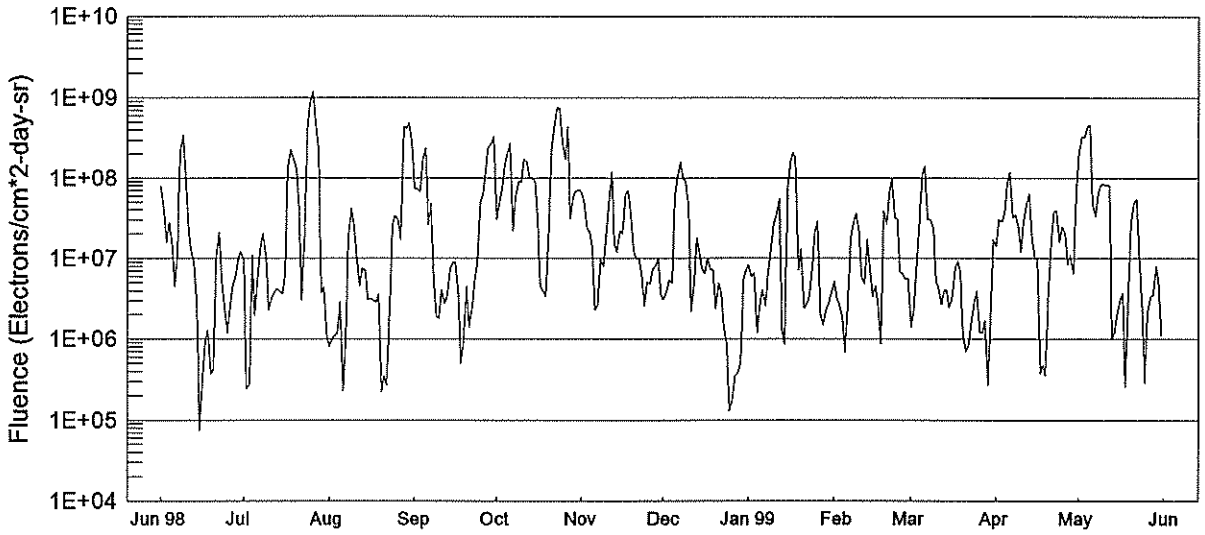



Mean Solar Magnetic Field Polarity: = field > 2 microT; = -2 microT ≤ field ≤ 2 microT

= field < -2 microT; No box = no data available

Observations are taken at 2000 UT. Rotation numbers given are the Bartels series, but the dates are not; these dates are five days earlier, to mark times of occurrence of phenomena on the Sun that affect the Earth during the given Bartels Rotation.

# GOES Daily Electron Fluence
## Jun 98 - May 99




| Day | Jun 98 | Jul | Aug | Sep | Oct | Nov | Dec | Jan 99 | Feb | Mar | Apr | May |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.8E+07 | 9.6E+06 | 8.1E+05 | 7.4E+07 | 3.0E+07 | 6.6E+07 | 3.1E+06 | 8.3E+06 | 5.2E+06 | 1.4E+06 | 1.4E+07 | 1.9E+08 |
| 2 | 3.9E+07 | 2.4E+05 | 1.0E+06 | 7.4E+07 | 4.8E+07 | 5.1E+07 | 3.9E+06 | 5.9E+06 | 3.2E+06 | 2.2E+06 | 3.0E+07 | 3.3E+08 |
| 3 | 1.6E+07 | 2.8E+05 | 1.1E+06 | 6.8E+07 | 7.0E+07 | 2.3E+07 | 5.4E+06 | 6.5E+06 | 2.7E+06 | 7.2E+06 | 2.9E+07 | 3.2E+08 |
| 4 | 2.8E+07 | 1.1E+07 | 1.2E+06 | 1.7E+08 | 1.5E+08 | 2.1E+07 | 4.9E+06 | 1.2E+06 | 1.8E+06 | 2.9E+07 | 3.6E+07 | 4.4E+08 |
| 5 | 1.4E+07 | 2.0E+06 | 2.9E+06 | 2.4E+08 | 2.1E+08 | 1.4E+07 | 5.8E+07 | 2.7E+06 | 6.8E+05 | 1.1E+08 | 8.3E+07 | 4.6E+08 |
| 6 | 4.5E+06 | 6.5E+06 | 2.3E+05 | 2.6E+07 | 2.7E+08 | 2.3E+06 | 1.0E+08 | 4.1E+06 | 3.4E+06 | 1.4E+08 | 1.2E+08 | 4.9E+07 |
| 7 | 1.1E+07 | 1.3E+07 | 9.5E+05 | 4.8E+07 | 2.2E+07 | 2.7E+06 | 1.6E+08 | 2.6E+06 | 1.8E+07 | 3.0E+07 | 3.2E+07 | 3.3E+07 |
| 8 | 2.0E+08 | 2.0E+07 | 1.8E+07 | 4.9E+06 | 5.8E+07 | 9.9E+06 | 1.0E+08 | 6.8E+06 | 2.7E+07 | 3.0E+07 | 3.5E+07 | 6.4E+07 |
| 9 | 3.5E+08 | 1.0E+07 | 4.2E+07 | 1.9E+06 | 9.0E+07 | 8.0E+06 | 9.1E+07 | 1.2E+07 | 3.6E+07 | 2.4E+07 | 2.5E+07 | 8.2E+07 |
| 10 | 1.1E+08 | 2.3E+06 | 2.5E+07 | 1.8E+06 | 8.9E+07 | 1.9E+07 | 4.3E+07 | 2.7E+07 | 2.2E+07 | 5.3E+06 | 1.2E+07 | 8.4E+07 |
| 11 | 2.1E+07 | 3.2E+06 | 1.1E+07 | 4.1E+06 | 1.7E+08 | 4.5E+07 | 2.2E+06 | 3.4E+07 | 5.9E+06 | 4.4E+06 | 2.8E+07 | 8.0E+07 |
| 12 | 1.2E+07 | 3.8E+06 | 4.6E+06 | 2.8E+06 | 1.6E+08 | 1.2E+08 | 5.1E+06 | 5.5E+07 | 4.9E+06 | 2.7E+06 | 4.8E+07 | 8.0E+07 |
| 13 | 9.0E+06 | 4.2E+06 | 7.5E+06 | 3.4E+06 | 1.0E+08 | 1.5E+07 | 1.8E+07 | 1.3E+06 | 1.7E+07 | 4.0E+06 | 6.3E+07 | 1.0E+06 |
| 14 | 2.6E+06 | 3.9E+06 | 7.2E+06 | 7.6E+06 | 1.0E+08 | 1.2E+07 | 1.2E+07 | 8.6E+05 | 7.8E+06 | 4.1E+06 | 1.9E+07 | 1.2E+06 |
| 15 | 7.5E+04 | 3.6E+06 | 3.1E+06 | 8.9E+06 | 9.2E+07 | 2.2E+07 | 7.5E+06 | 7.7E+07 | 3.4E+06 | 2.5E+06 | 9.8E+06 | 2.0E+06 |
| 16 | 2.7E+05 | 6.6E+06 | 3.2E+06 | 8.9E+06 | 3.1E+07 | 2.0E+07 | 6.4E+06 | 1.6E+08 | 4.6E+06 | 3.2E+06 | 1.0E+07 | 3.1E+06 |
| 17 | 9.6E+05 | 1.3E+08 | 3.0E+06 | 3.5E+06 | 4.7E+06 | 6.4E+07 | 1.0E+07 | 2.1E+08 | 2.9E+06 | 7.9E+06 | 3.8E+05 | 3.7E+06 |
| 18 | 1.3E+06 | 2.3E+08 | 2.9E+06 | 5.0E+05 | 4.0E+06 | 7.0E+07 | 7.3E+06 | 1.8E+08 | 8.7E+05 | 9.2E+06 | 4.8E+05 | 2.6E+05 |
| 19 | 3.7E+05 | 1.7E+08 | 3.6E+06 | 9.0E+05 | 3.4E+06 | 3.7E+07 | 7.2E+06 | 7.1E+06 | 3.9E+07 | 6.6E+06 | 3.5E+05 | 4.1E+06 |
| 20 | 4.2E+05 | 1.3E+08 | 2.2E+05 | 4.5E+06 | 1.5E+07 | 1.2E+07 | 2.4E+06 | 1.3E+07 | 2.7E+07 | 1.2E+06 | 4.5E+06 | 2.8E+07 |
| 21 | 1.0E+07 | 4.0E+07 | 3.5E+05 | 1.4E+06 | 2.3E+08 | 9.8E+06 | 4.9E+06 | 2.4E+06 | 6.3E+07 | 7.0E+05 | 1.6E+07 | 5.1E+07 |
| 22 | 2.1E+07 | 3.0E+06 | 2.7E+05 | 2.5E+06 | 4.2E+08 | 1.0E+07 | 3.8E+06 | 2.7E+06 | 1.0E+08 | 8.2E+05 | 3.8E+07 | 5.4E+07 |
| 23 | 5.2E+06 | 2.1E+07 | 2.5E+06 | 5.6E+06 | 7.5E+08 | 6.6E+06 | 1.4E+06 | 3.2E+06 | 3.2E+07 | 1.5E+06 | 3.9E+07 | 1.1E+07 |
| 24 | 2.7E+06 | 4.1E+08 | 2.6E+07 | 8.7E+06 | 7.4E+08 | 2.6E+06 | 8.5E+05 | 7.8E+06 | 3.1E+07 | 2.8E+06 | 1.6E+07 | 2.3E+06 |
| 25 | 1.2E+06 | 8.5E+08 | 3.4E+07 | 5.2E+07 | 3.0E+08 | 5.1E+06 | 1.3E+05 | 2.1E+07 | 6.8E+06 | 4.0E+06 | 2.5E+07 | 2.9E+05 |
| 26 | 2.4E+06 | 1.2E+09 | 3.0E+07 | 6.2E+07 | 1.7E+08 | 4.8E+06 | 1.8E+05 | 2.9E+07 | 6.4E+06 | 1.2E+06 | 2.0E+07 | 2.1E+06 |
| 27 | 4.6E+06 | 4.9E+08 | 1.7E+07 | 1.2E+08 | 4.4E+08 | 7.3E+06 | 3.5E+05 | 2.0E+06 | 5.5E+06 | 1.2E+06 | 8.5E+06 | 3.4E+06 |
| 28 | 6.0E+06 | 2.2E+08 | 4.4E+08 | 2.4E+08 | 3.1E+07 | 8.0E+06 | 3.8E+05 | 1.5E+06 | 5.6E+06 | 1.7E+06 | 1.1E+07 | 3.5E+06 |
| 29 | 1.0E+07 | 3.8E+06 | 4.2E+08 | 2.7E+08 | 6.1E+07 | 1.0E+07 | 5.0E+05 | 2.3E+06 | | 2.7E+05 | 6.4E+06 | 8.0E+06 |
| 30 | 1.2E+07 | 4.4E+06 | 4.9E+08 | 3.3E+08 | 6.9E+07 | 3.5E+06 | 5.4E+06 | 2.8E+06 | | 1.7E+06 | 6.0E+07 | 4.7E+06 |
| 31 | | 1.1E+06 | 2.7E+08 | | 7.2E+07 | | 7.1E+06 | 3.6E+06 | | 1.7E+07 | | 1.1E+06 |

NOTE: The electron detector responds significantly to protons above 32 MeV; therefore, electron data are contaminated when a proton event is in progress. These days are indicated with '-999' in the table and are not plotted. '--' indicates data not available.

NOTE: GOES9 data began April, 1996 and ended on 26 July, 1998. GOES8 is primary satellite as of 27 July, 1998.

# CONTENTS

Prompt Reports — Number 658 Part I

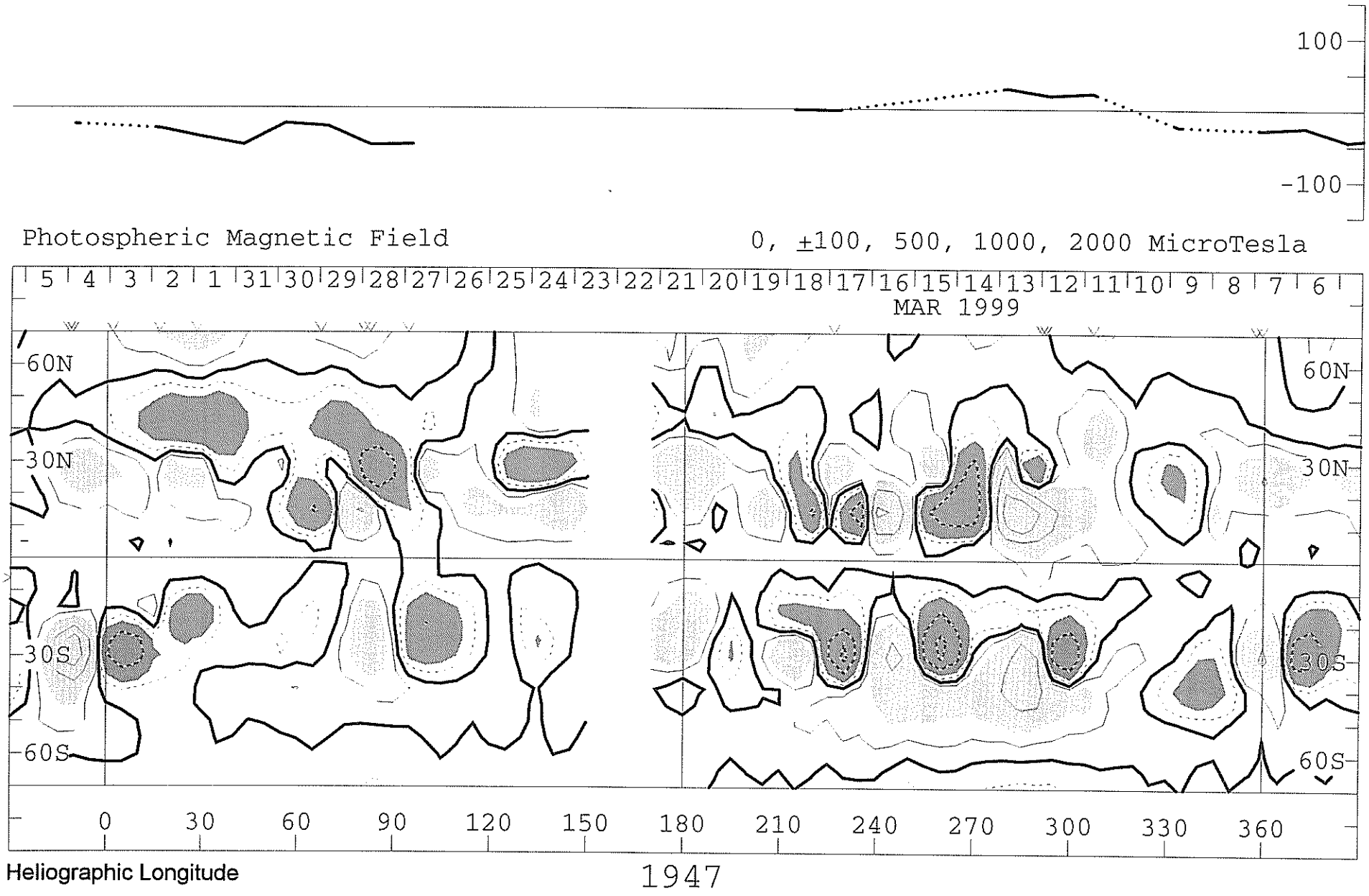
## DATA FOR APRIL 1999

# SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1947

(7 March to 4 April 1999)

WILCOX SOLAR OBSERVATORY



# SOLAR MAGNETIC FIELD SYNOPTIC CHART

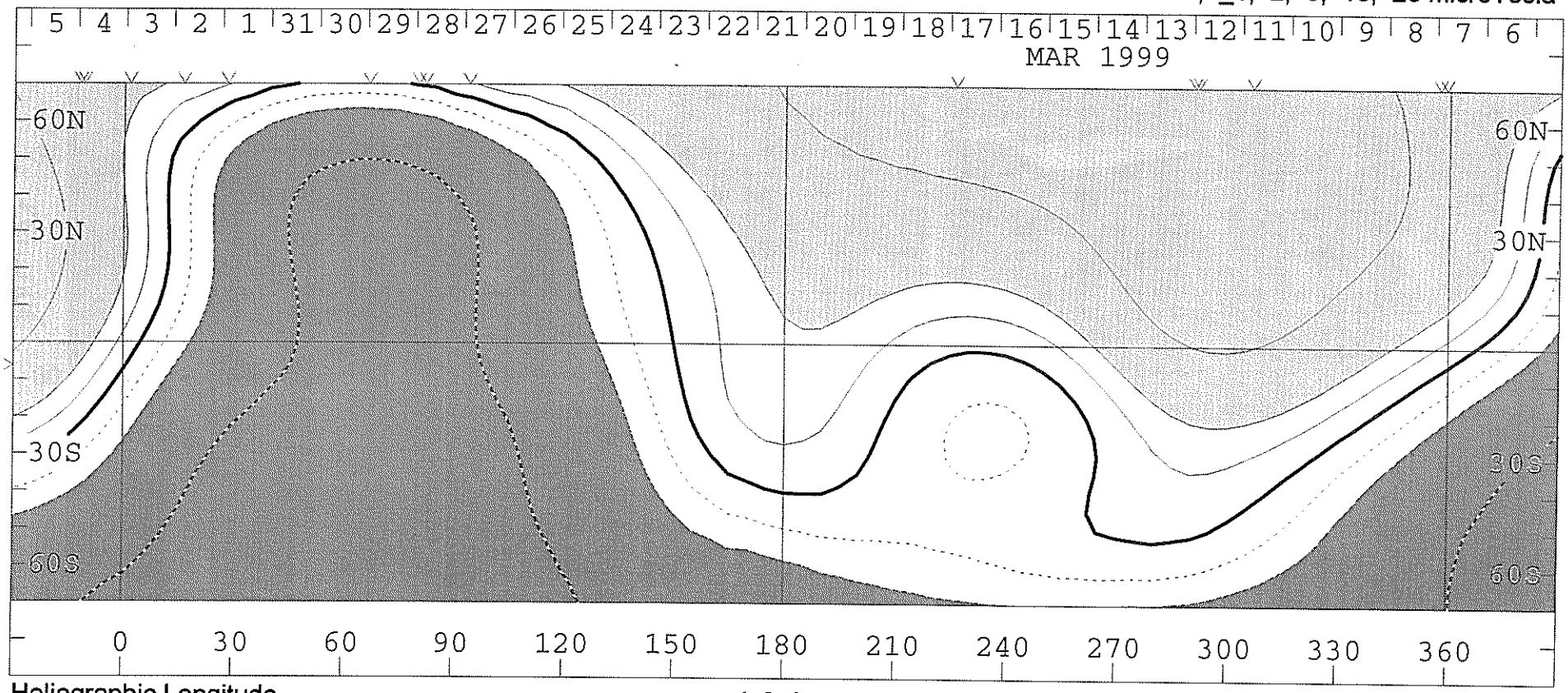
**SOURCE SURFACE FIELD**

CARRINGTON ROTATION NUMBER 1947

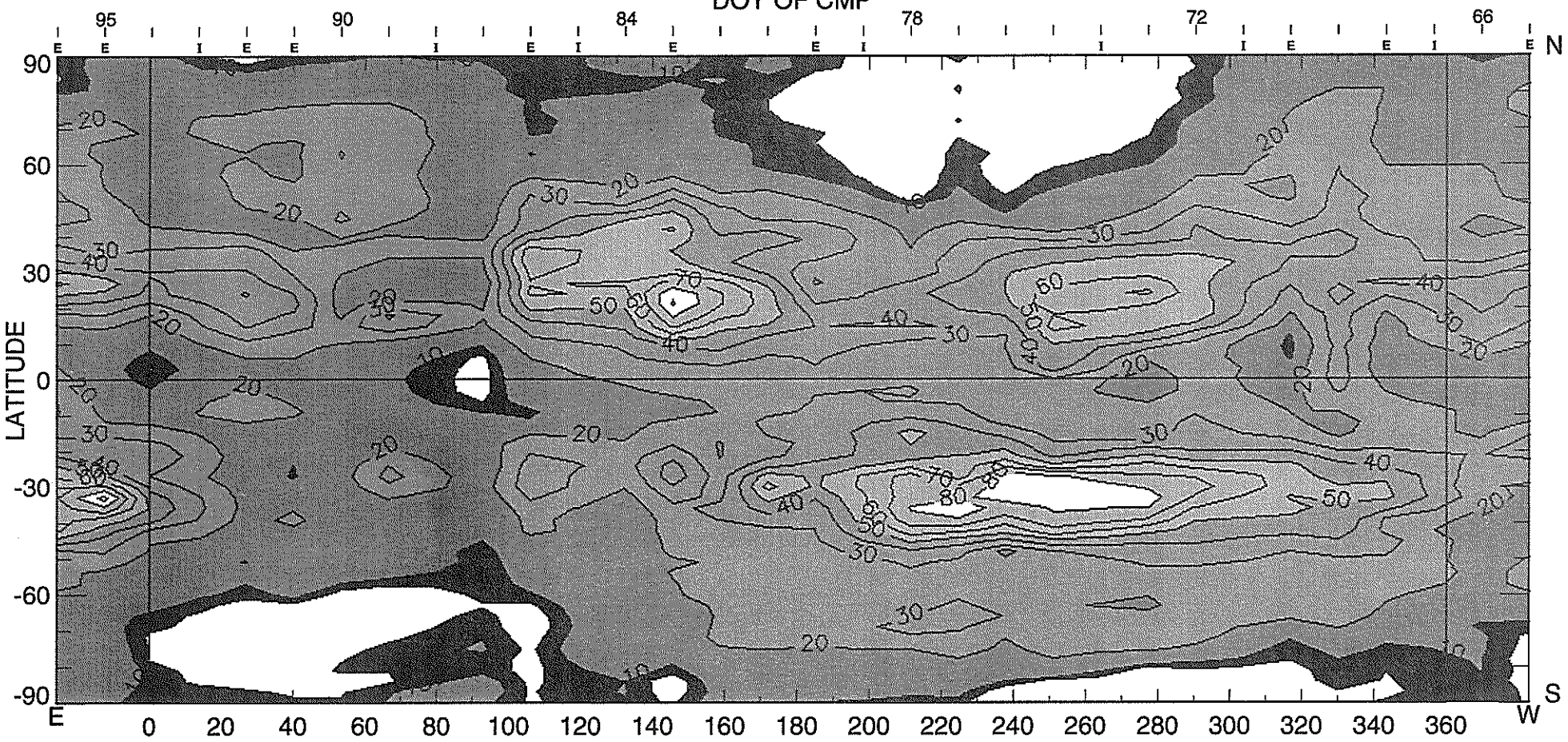
(7 March to 4 April 1999)

**Wilcox Solar Observatory**

0, ±1, 2, 5, 10, 20 microTesla



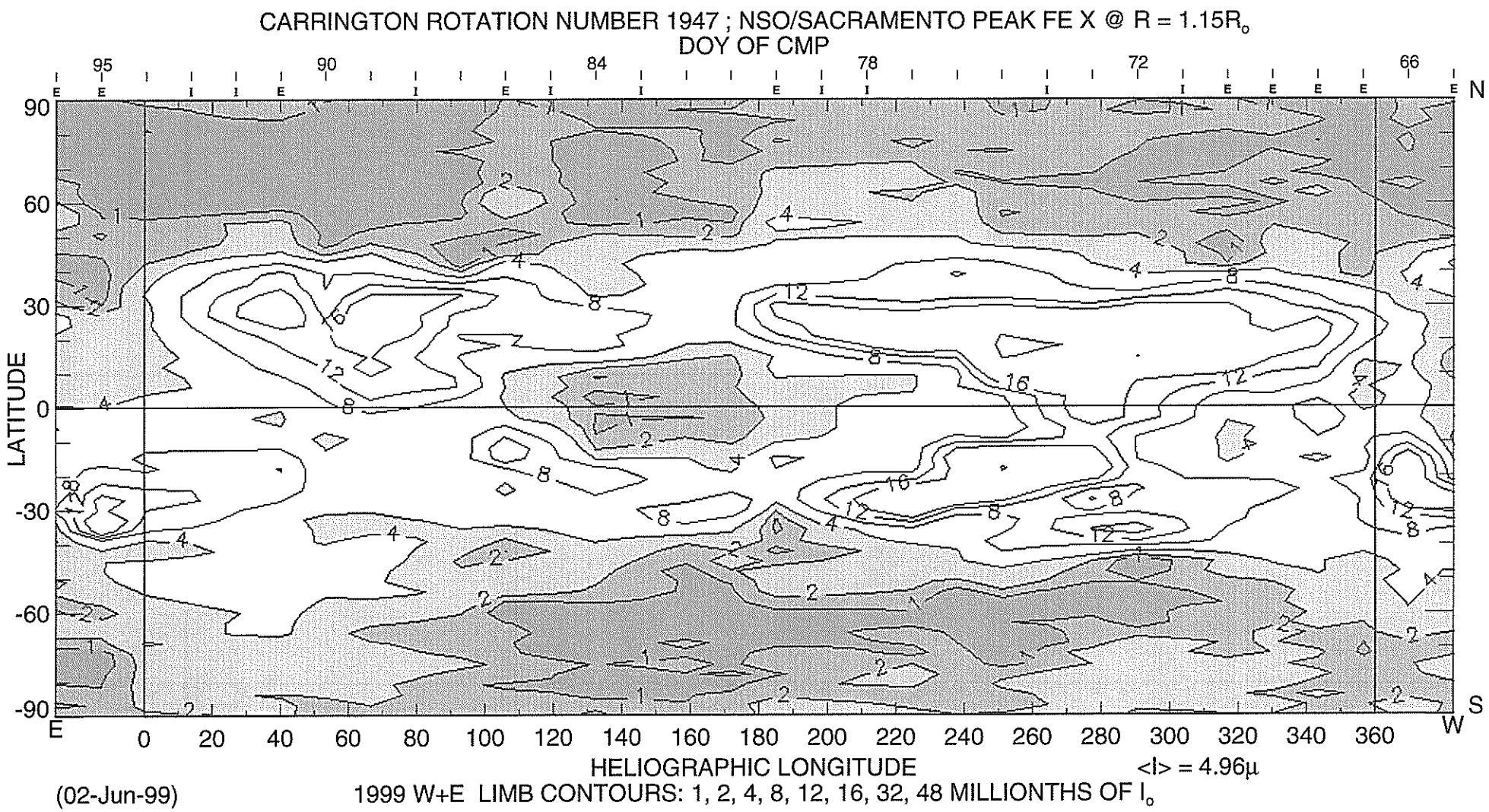
CARRINGTON ROTATION NUMBER 1947 ; NSO/SACRAMENTO PEAK FE XIV @ R = 1.15$R_o$

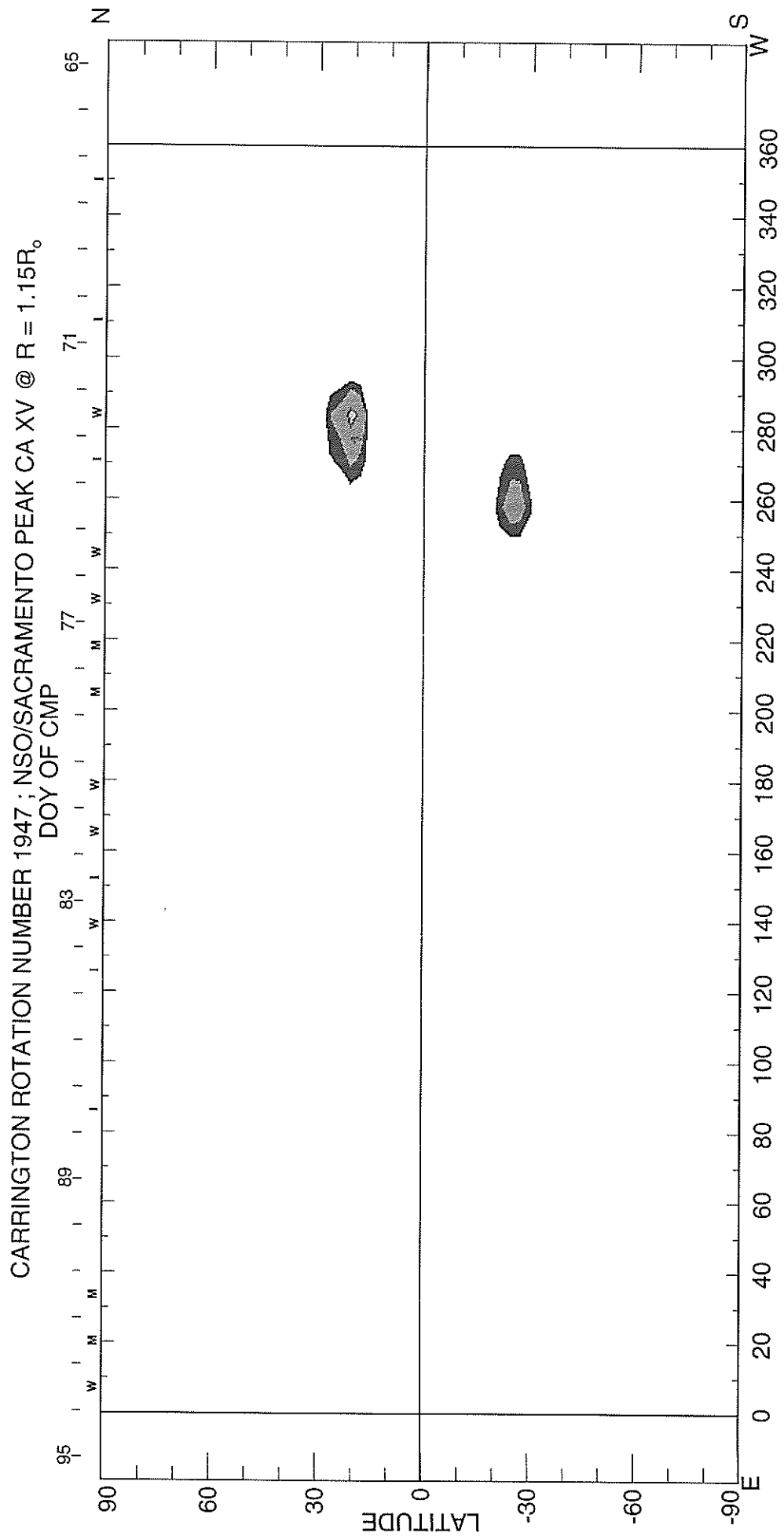



<I> = 23.91μ

(02-Jun-99) 1999 W+E LIMB CONTOURS: 7, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 MILLIONTHS OF $I_o$

CORONAL HOLES ARE SHOWN AS WHITE BORDERED BY BLACK


CARRINGTON ROTATION NUMBER 1947 ; NSO/SACRAMENTO PEAK FE X @ R = 1.15R$_o$
DOY OF CMP
95
90
84
78
72
66
E
I
N
S
LATITUDE
90
60
30
0
-30
-60
-90
E
W
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
HELIOGRAPHIC LONGITUDE
<I> = 4.96μ
(02-Jun-99)
1999 W+E LIMB CONTOURS: 1, 2, 4, 8, 12, 16, 32, 48 MILLIONTHS OF I$_o$


CARRINGTON ROTATION NUMBER 1947 ; NSO/SACRAMENTO PEAK CA XV @ R = 1.15R$_o$
DOY OF CMP
95
89
83
77
71
65
N
S
E
W
90
60
30
0
-30
-60
-90
LATITUDE
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360
HELIOGRAPHIC LONGITUDE
(02-Jun-99)
1999 E+W LIMB CONTOURS: YELMIN, 1, 2, 3, 4, 6, 8 MILLIONTHS OF I$_o$

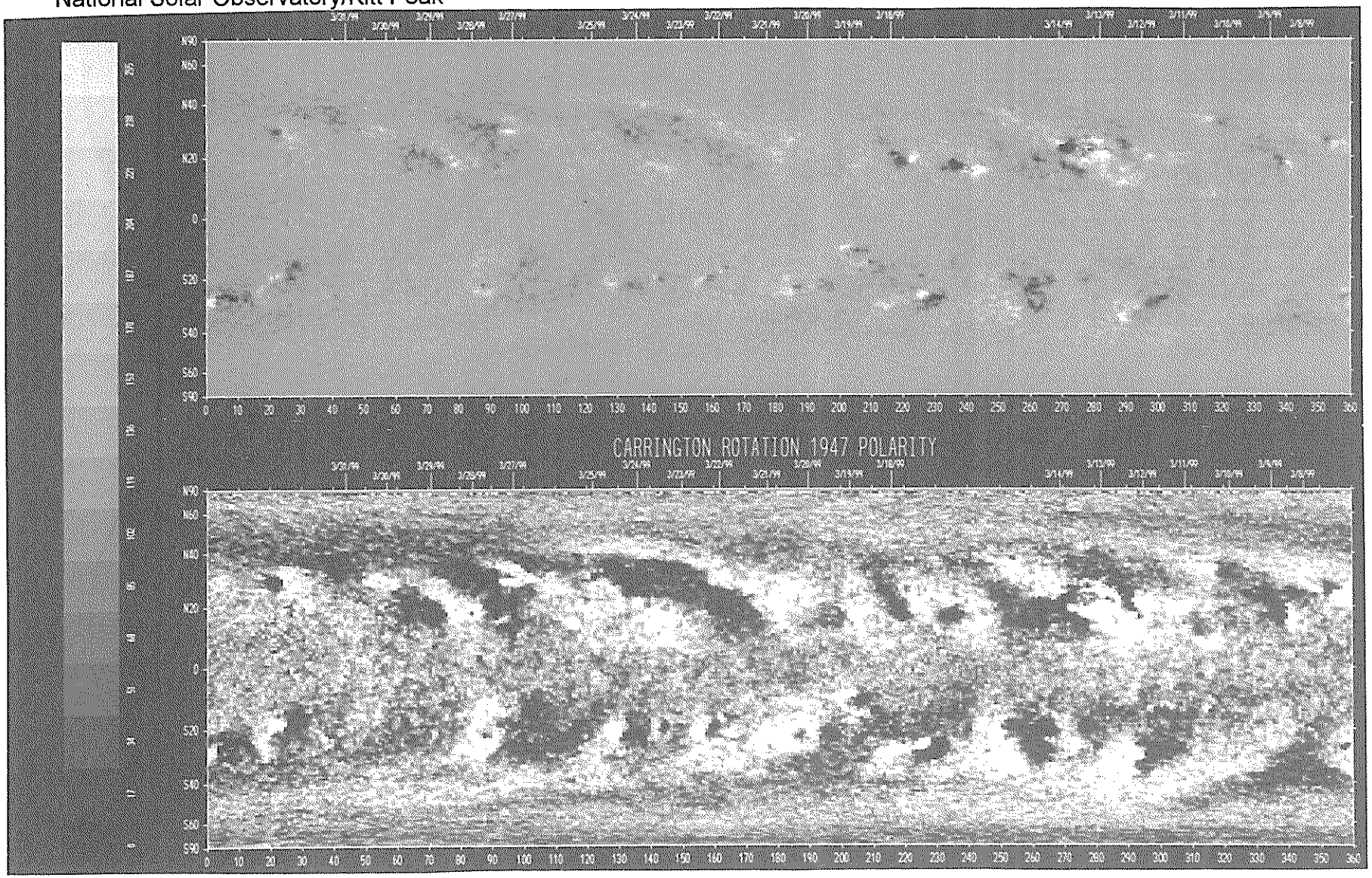
# SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1947

(7 March to 4 April 1999)

National Solar Observatory/Kitt Peak

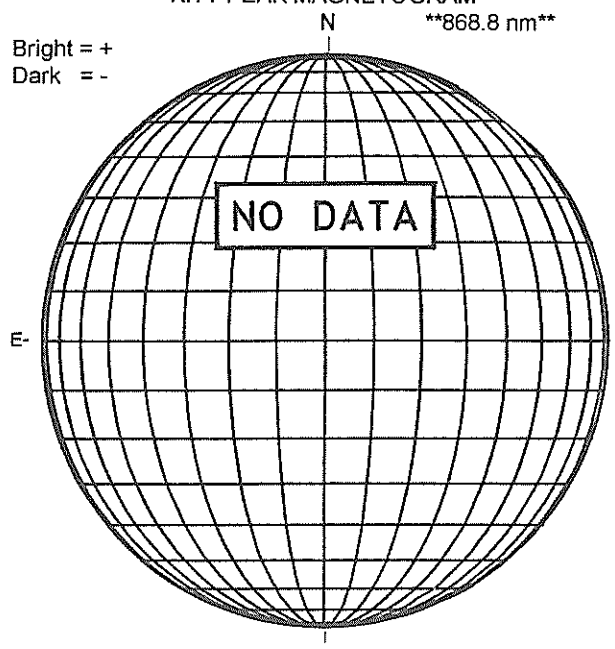
Dates of Observation



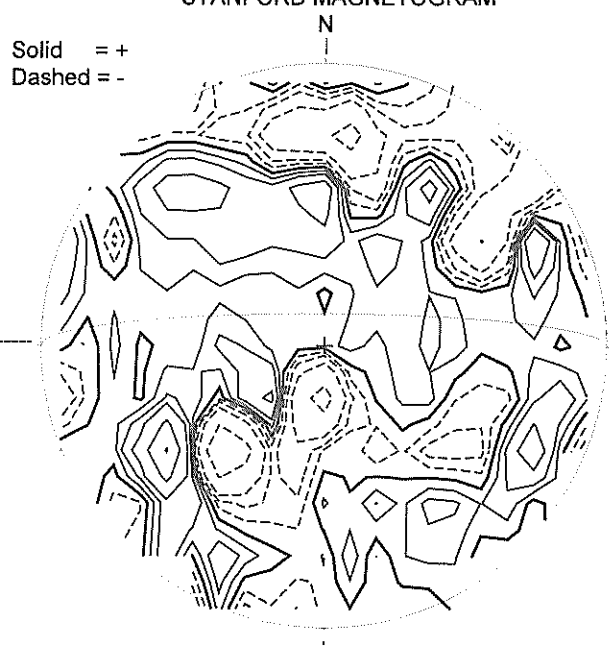

Heliographic Longitude

# APRIL 1, 1999 ( P= -26.15, Bo = -6.56, Lo = 40.04)

KITT PEAK MAGNETOGRAM

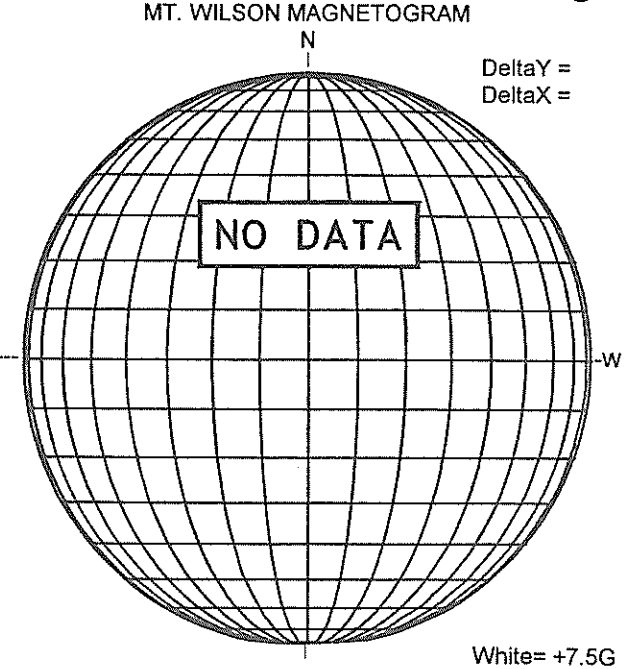



STANFORD MAGNETOGRAM



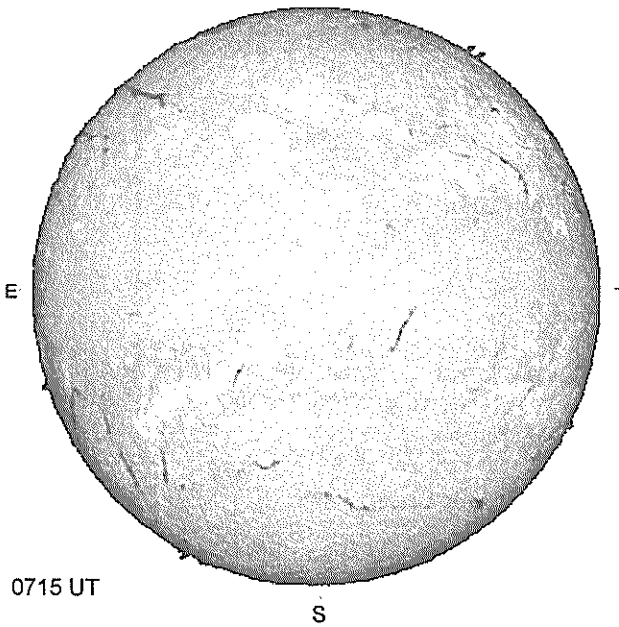

2130 UT

MT. WILSON MAGNETOGRAM



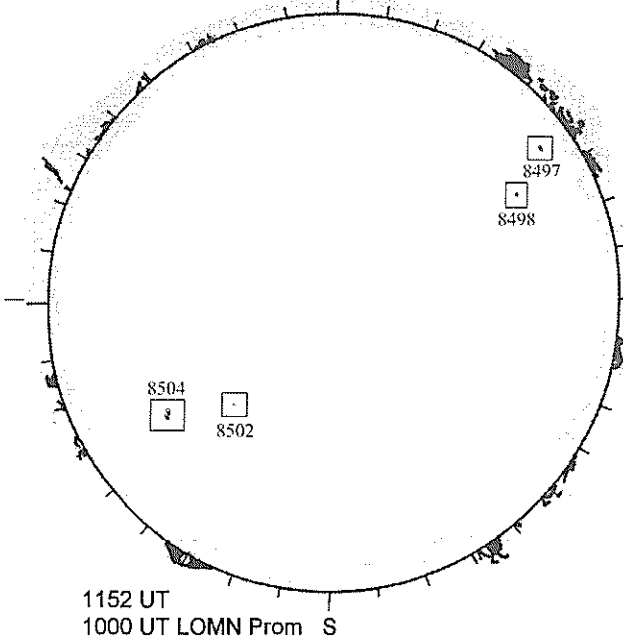

White= +7.5G
Black = -7.5G

MEUDON H-ALPHA



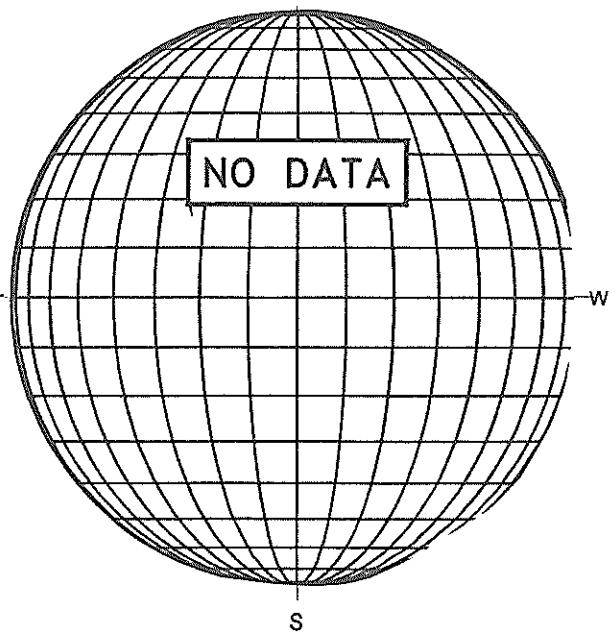

0715 UT

RAMEY SUNSPOT



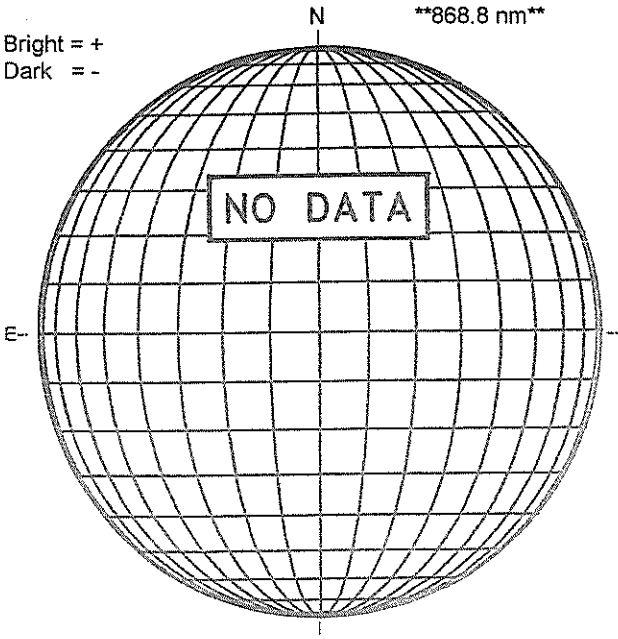

1152 UT
1000 UT LOMN Prom S

SACRAMENTO PEAK CORONA (1.15 Radii)----

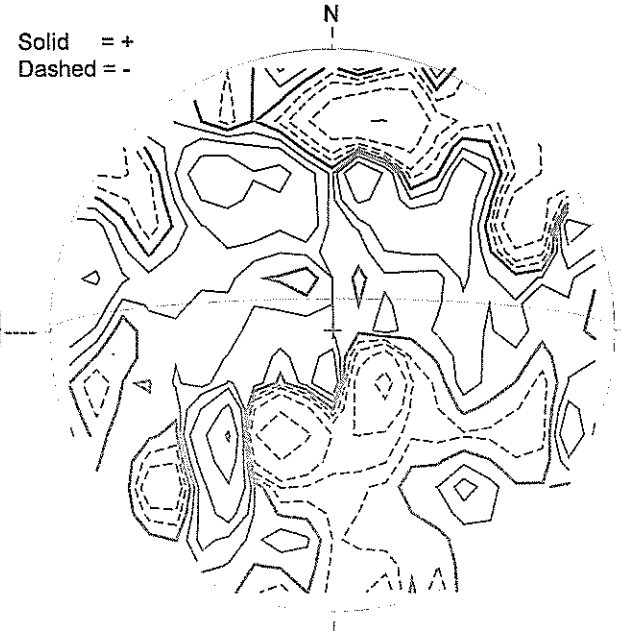


**APRIL 2, 1999 ( P= -26.19, Bo = -6.51, Lo = 26.85)**

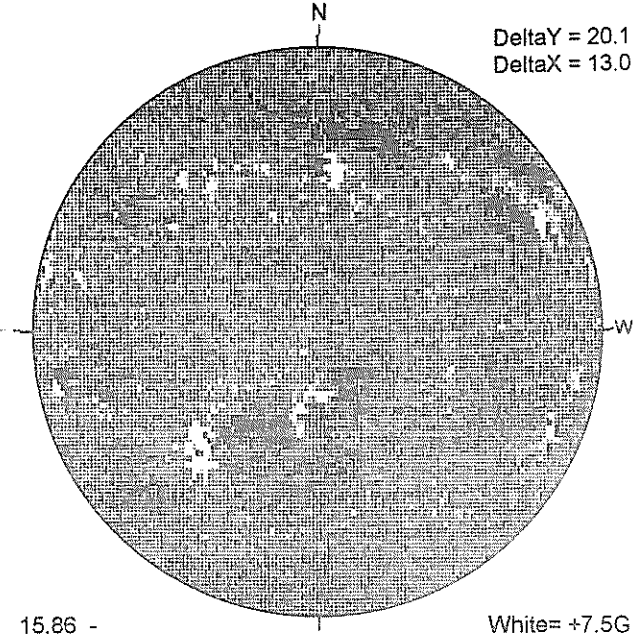
KITT PEAK MAGNETOGRAM



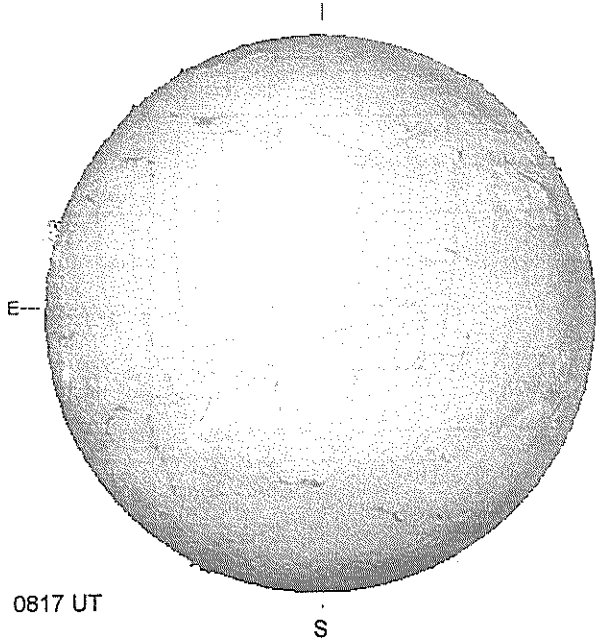

STANFORD MAGNETOGRAM



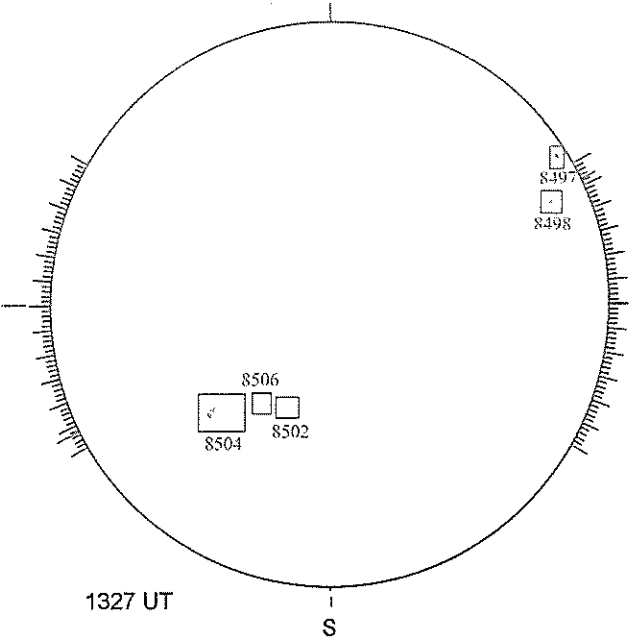

MT. WILSON MAGNETOGRAM



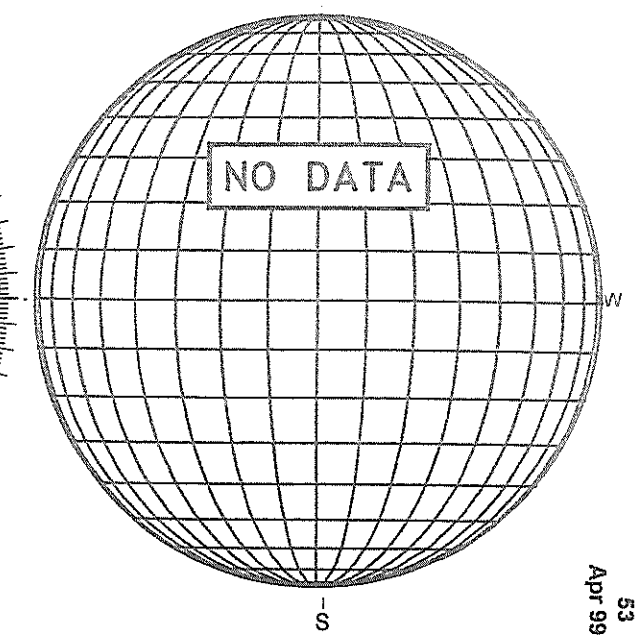

MEUDON H-ALPHA




RAMEY SUNSPOT



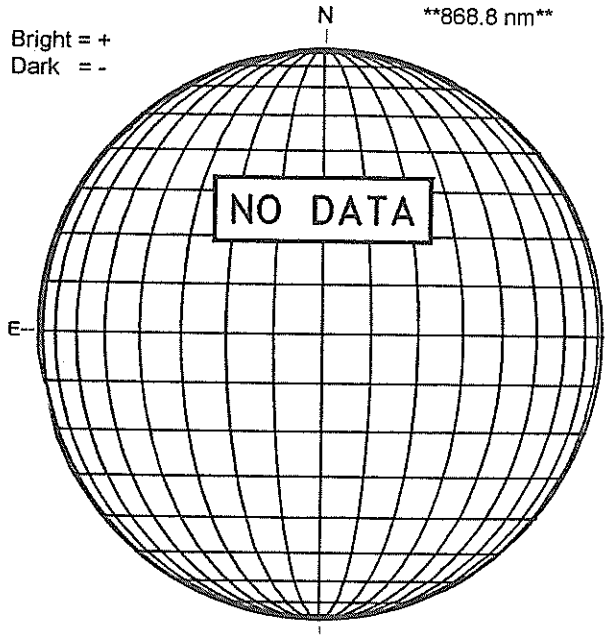

SACRAMENTO PEAK CORONA (1.15 Radii)



# APRIL 3, 1999 ( P= -26.23, Bo = -6.45, Lo = 13.66)

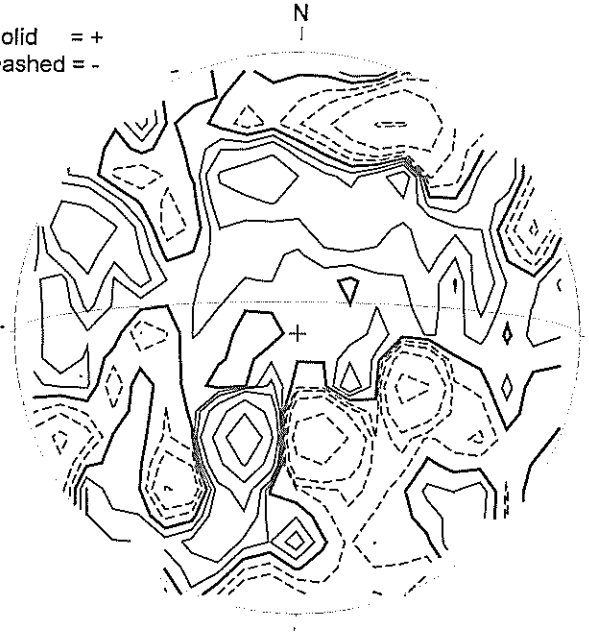
## KITT PEAK MAGNETOGRAM

Bright = +
Dark = -




## STANFORD MAGNETOGRAM

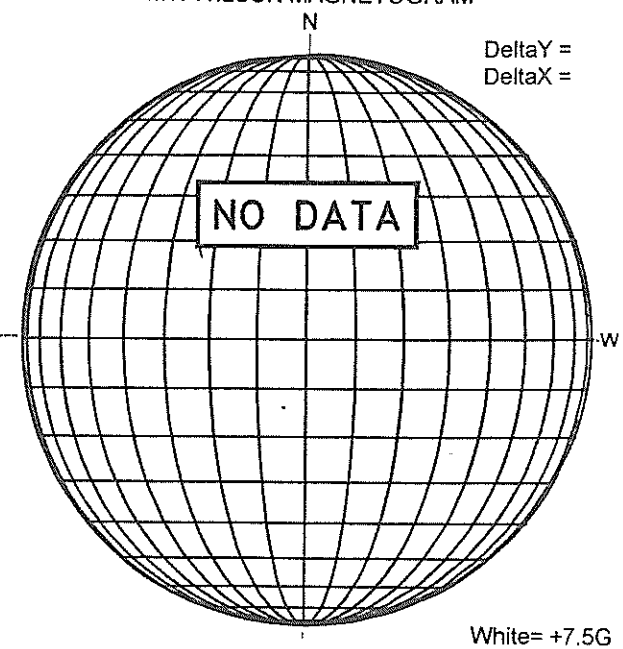
Solid = +
Dashed = -




2157 UT

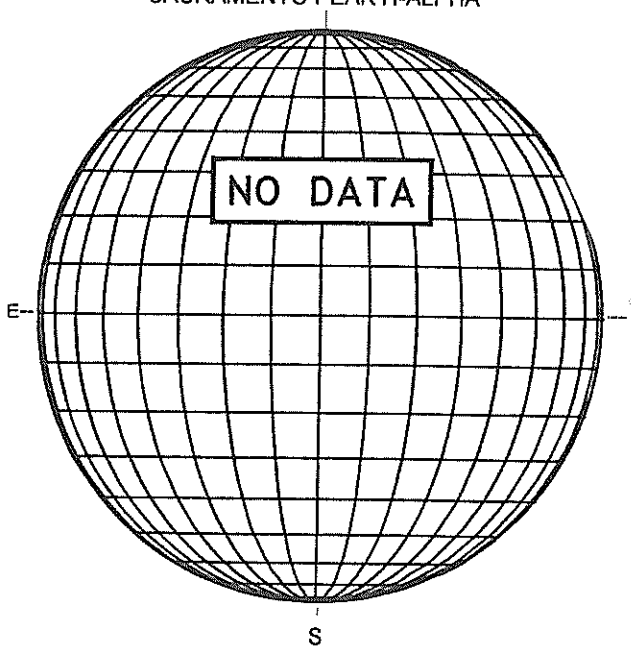
## MT. WILSON MAGNETOGRAM

DeltaY =
DeltaX =

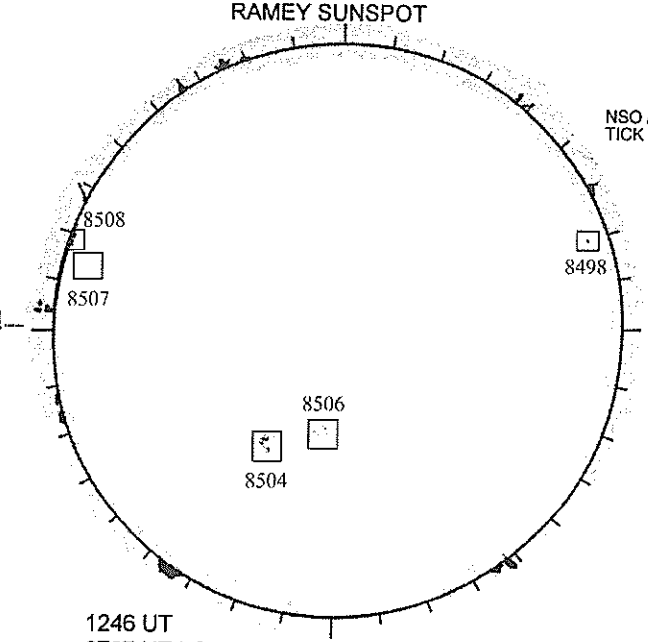



White= +7.5G
Black = -7.5G

## SACRAMENTO PEAK H-ALPHA



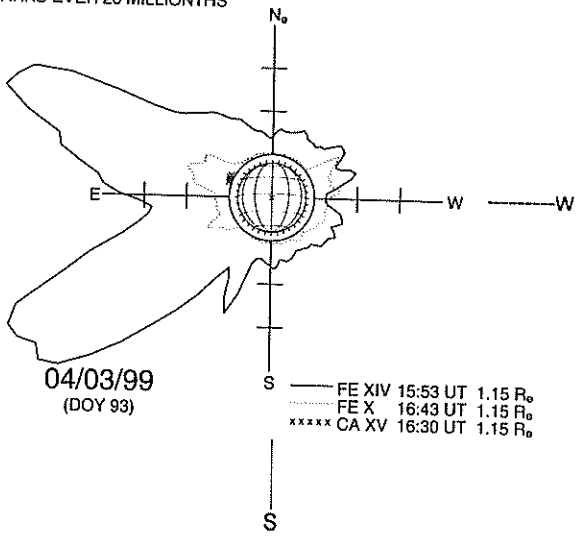

## RAMEY SUNSPOT




1246 UT
0707 UT LOMN Prom

## SACRAMENTO PEAK CORONA (1.15 Radii)

NSO / SACRAMENTO PEAK CORONAL DATA
TICK MARKS EVER 20 MILLIONTHS

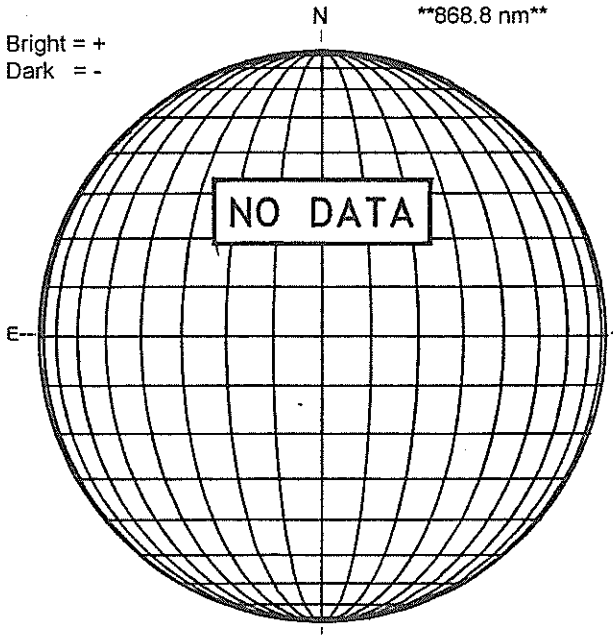



04/03/99
(DOY 93)

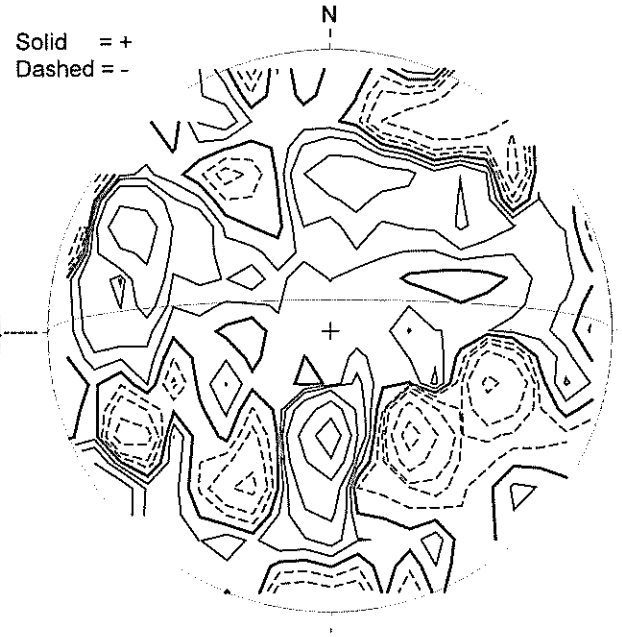
FE XIV 15:53 UT 1.15 $R_o$
FE X 16:43 UT 1.15 $R_o$
CA XV 16:30 UT 1.15 $R_o$

**APRIL 4, 1999 ( P= -26.25, Bo = -6.40, Lo = 0.46)**

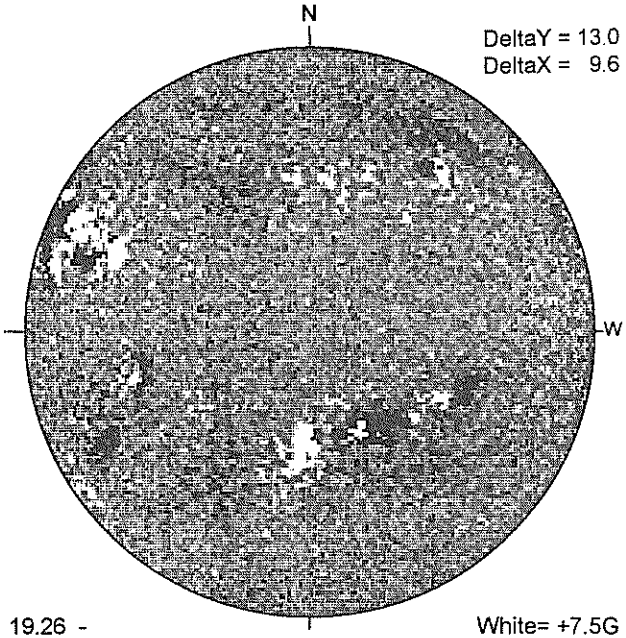
KITT PEAK MAGNETOGRAM



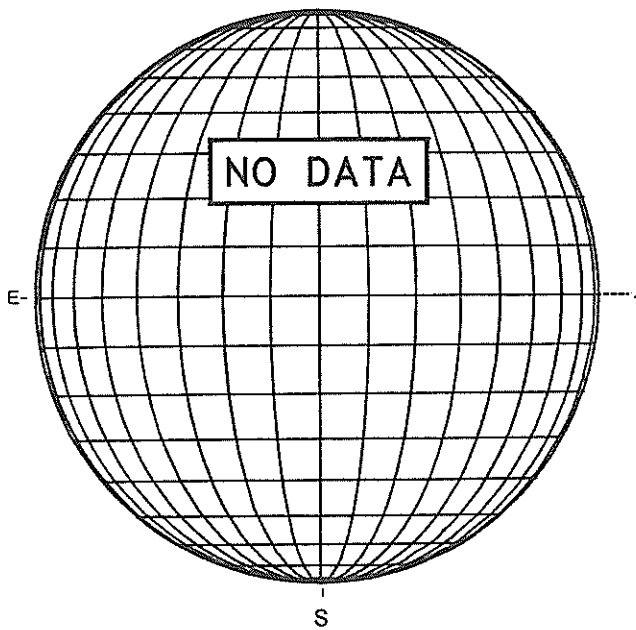

STANFORD MAGNETOGRAM



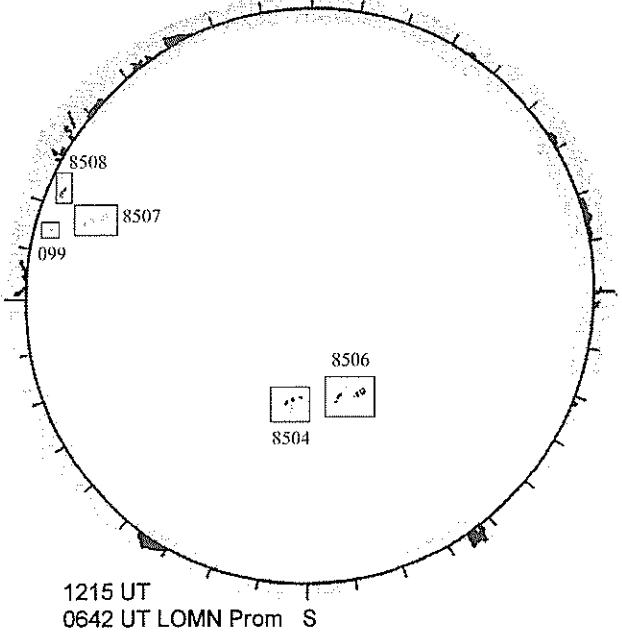

MT. WILSON MAGNETOGRAM



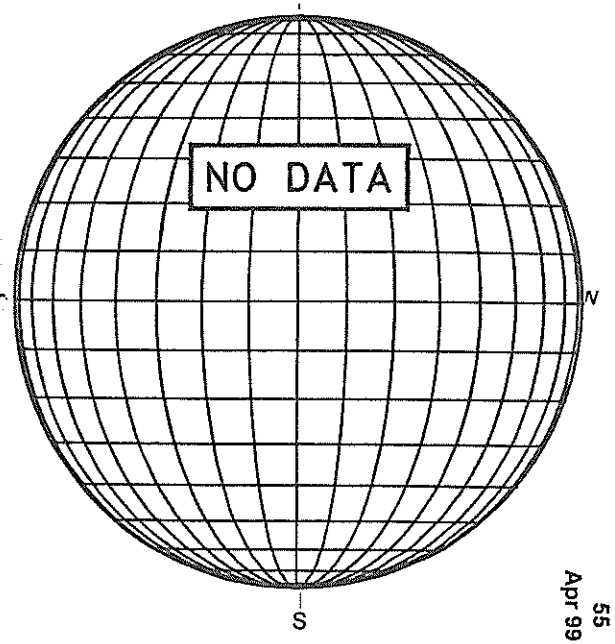

MEUDON H-ALPHA




RAMEY SUNSPOT

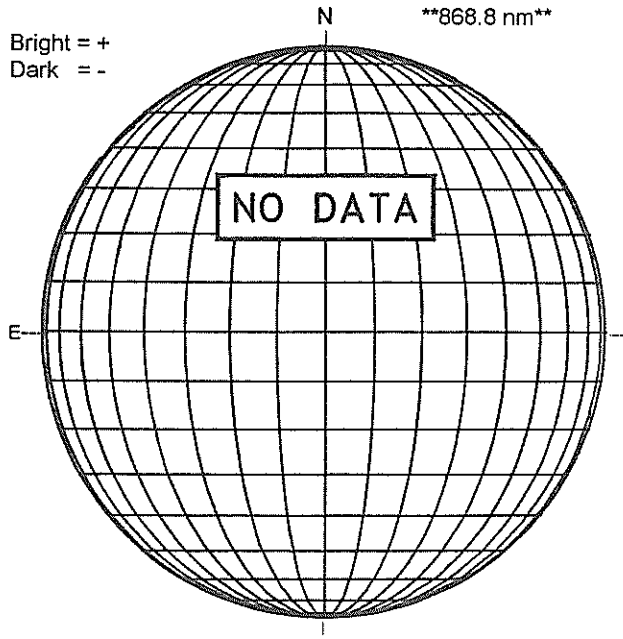



SACRAMENTO PEAK CORONA (1.15 Radii)----

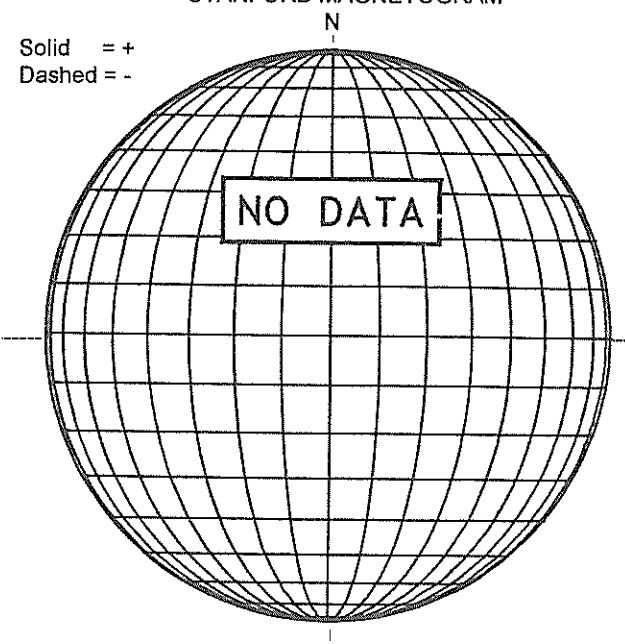


# APRIL 5, 1999 ( P= -26.28, Bo = -6.34, Lo = 347.27)

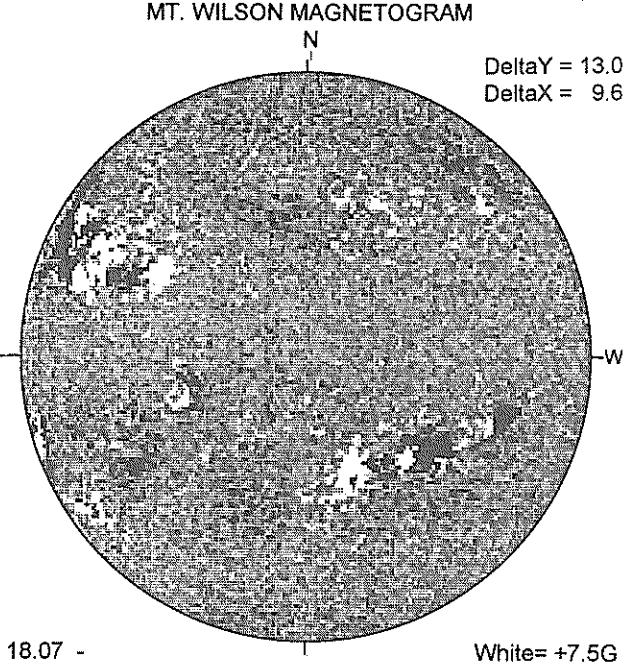
## KITT PEAK MAGNETOGRAM




## STANFORD MAGNETOGRAM



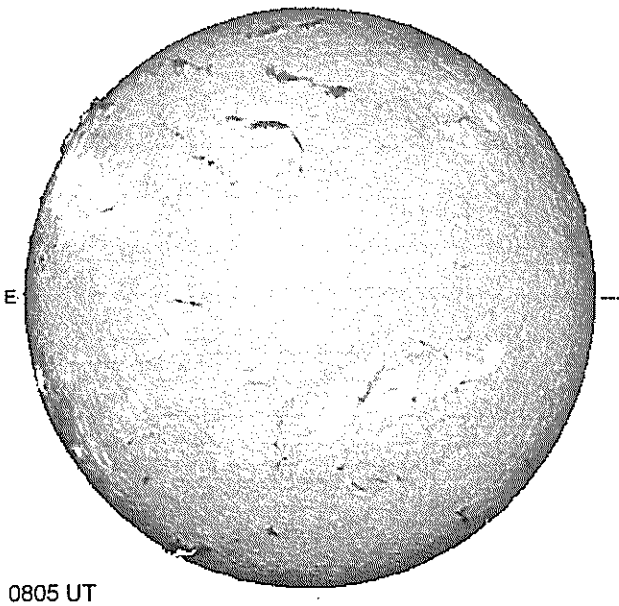

## MT. WILSON MAGNETOGRAM




18.07 -
19.02 UT

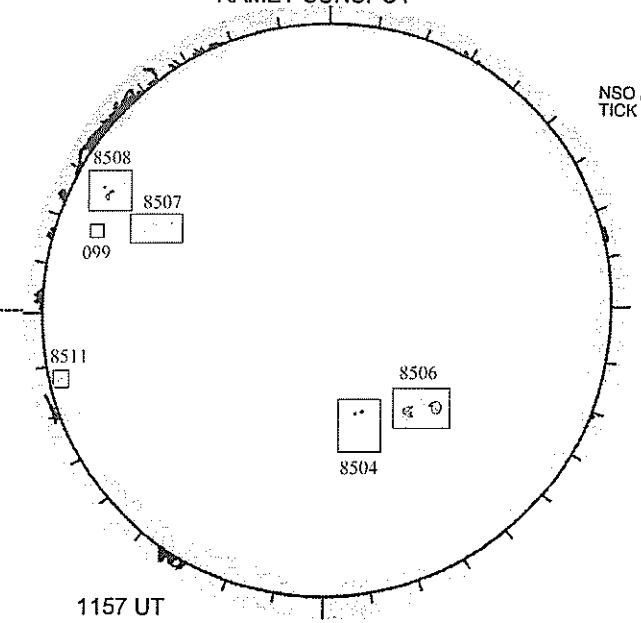
White= +7.5G
Black = -7.5G

## MEUDON H-ALPHA



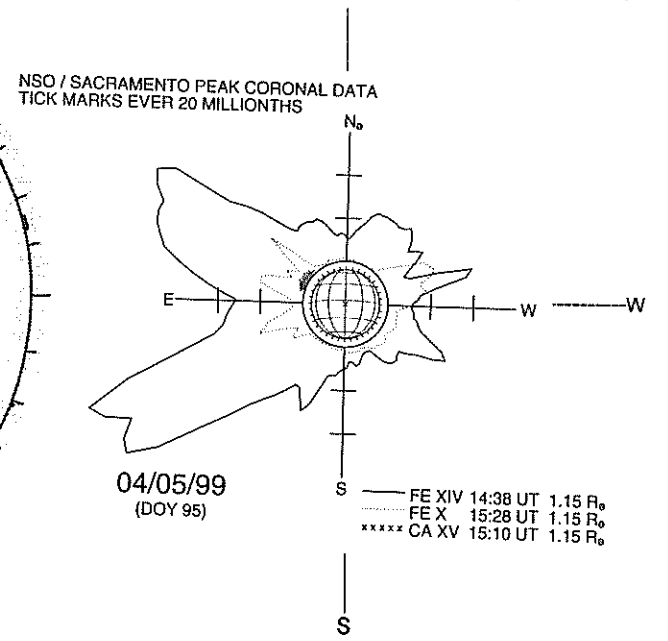

0805 UT

## RAMEY SUNSPOT




1157 UT
0628 UT LOMN Prom

## SACRAMENTO PEAK CORONA (1.15 Radii)



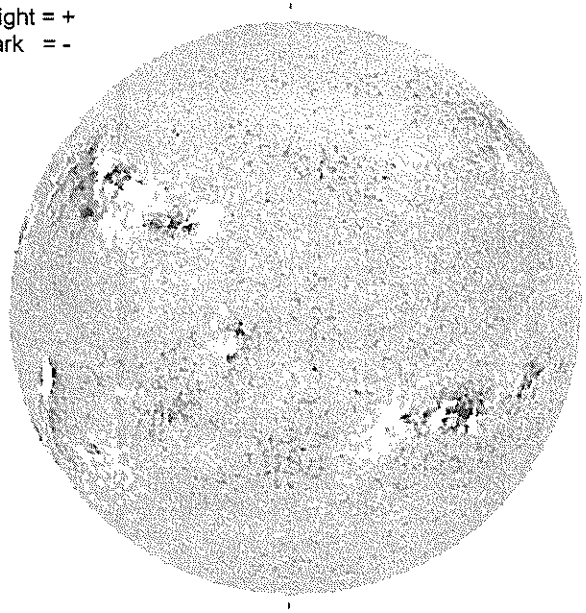

04/05/99
(DOY 95)

**APRIL 6, 1999 ( P= -26.29, Bo = -6.27 Lo = 334.07)**

KITT PEAK MAGNETOGRAM

N **868.8 nm**

Bright = +
Dark = -



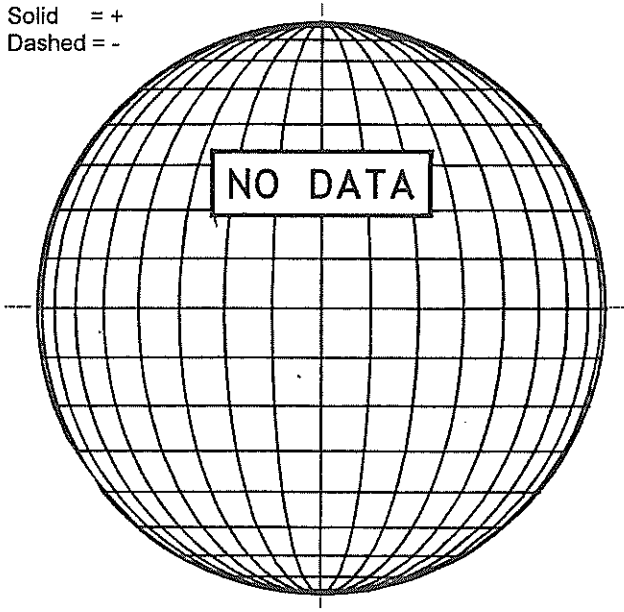
E–

1512 UT

STANFORD MAGNETOGRAM

N

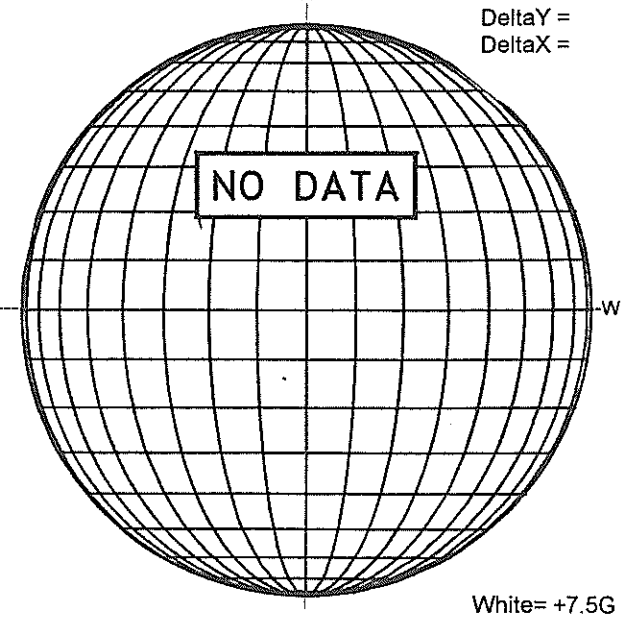
Solid = +
Dashed = -




MT. WILSON MAGNETOGRAM

N

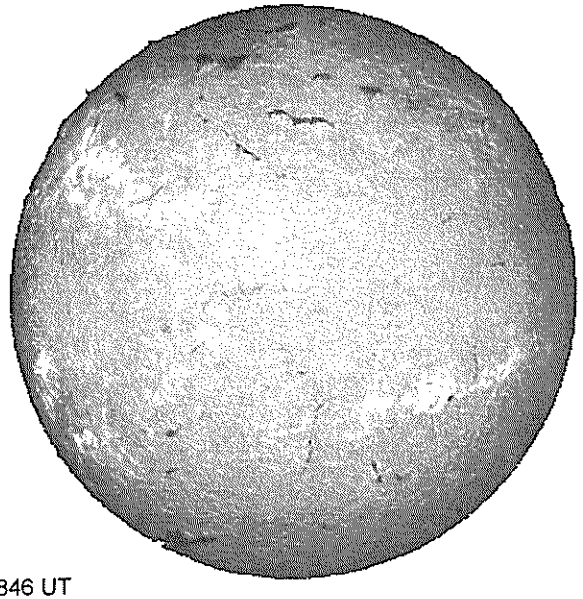
DeltaY =
DeltaX =




–W

White= +7.5G
Black = -7.5G

MEUDON H-ALPHA

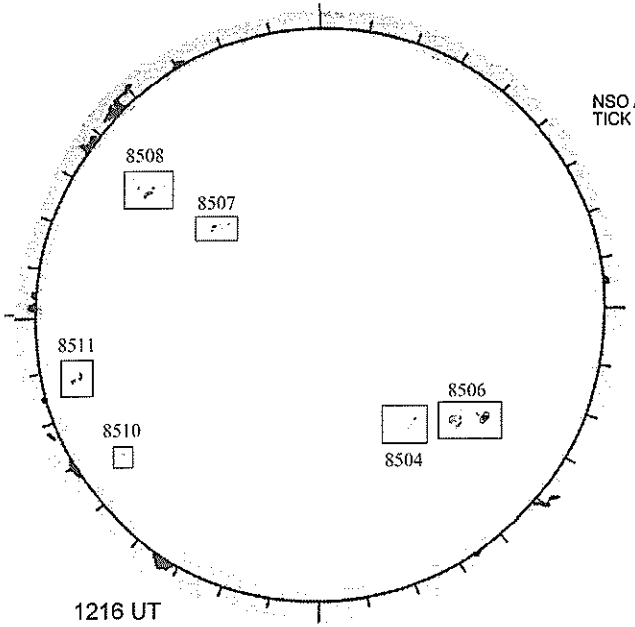


E–

0846 UT

S

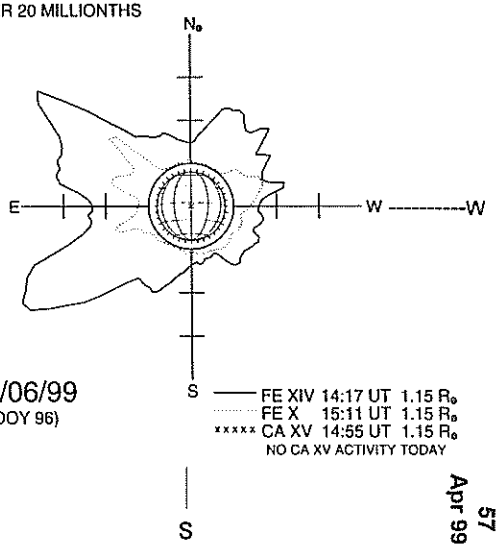
RAMEY SUNSPOT




1216 UT
0600 UT LOMN Prom S

SACRAMENTO PEAK CORONA (1.15 Radii)

NSO / SACRAMENTO PEAK CORONAL DATA
TICK MARKS EVER 20 MILLIONTHS




04/06/99
(DOY 96)

FE XIV 14:17 UT 1.15 R
FE X 15:11 UT 1.15 R
CA XV 14:55 UT 1.15 R
NO CA XV ACTIVITY TODAY

S

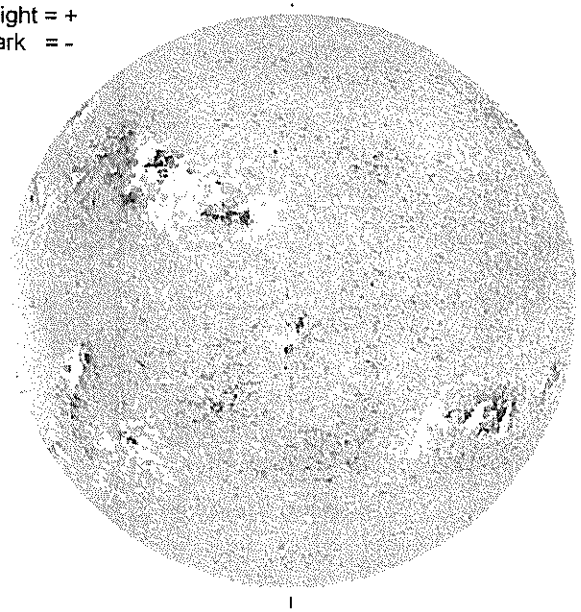
APRIL 7, 1999 ( P= -26.29, Bo = -6.21 Lo = 320.88)

KITT PEAK MAGNETOGRAM

N

**868.8 nm**

Bright = +
Dark = -



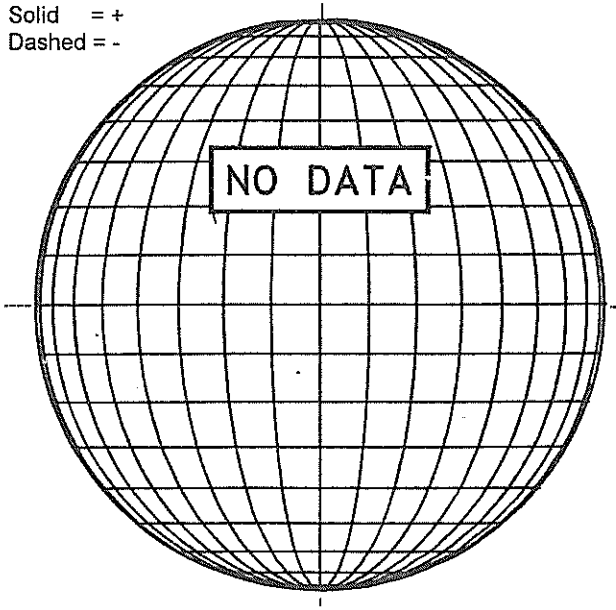
E-

1452 UT

STANFORD MAGNETOGRAM

N

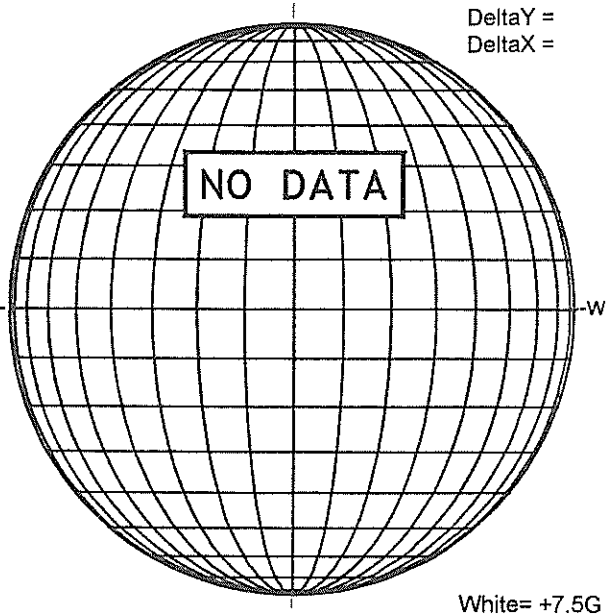
Solid = +
Dashed = -




MT. WILSON MAGNETOGRAM

N

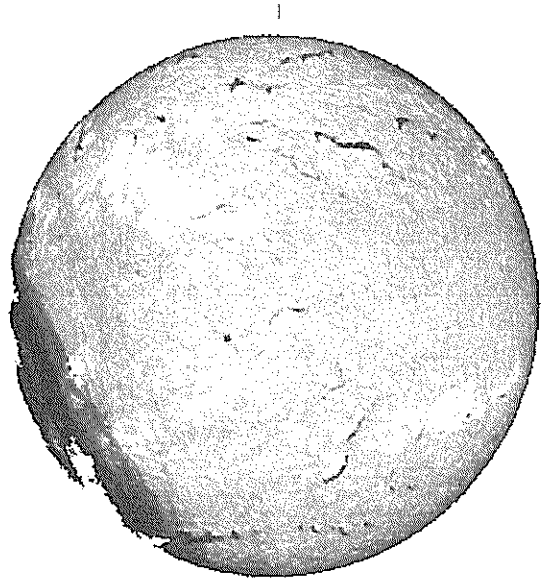
DeltaY =
DeltaX =




-W

White= +7.5G
Black = -7.5G

---- MEUDON H-ALPHA

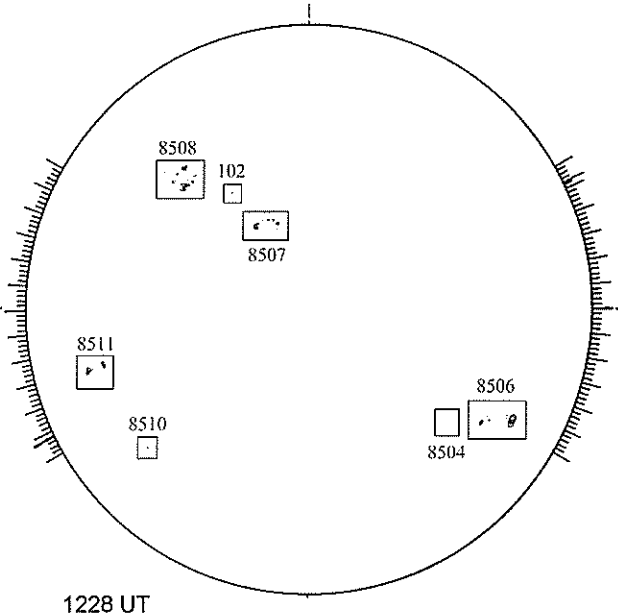


E---

1548 UT

S

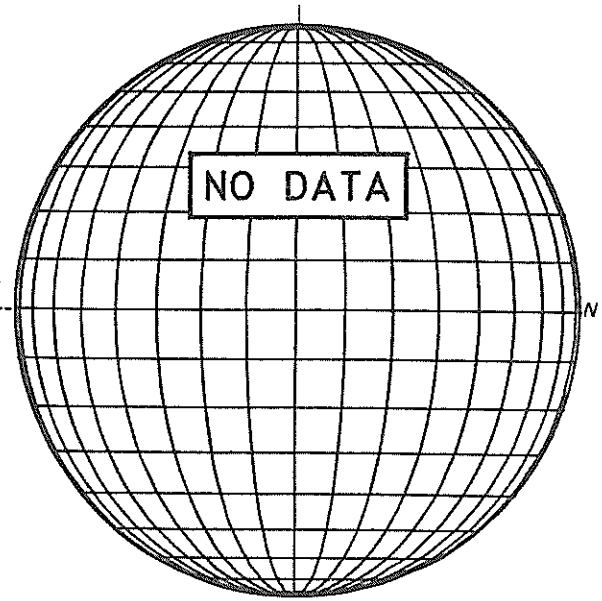
RAMEY SUNSPOT




1228 UT

S

SACRAMENTO PEAK CORONA (1.15 Radii)----




W

S

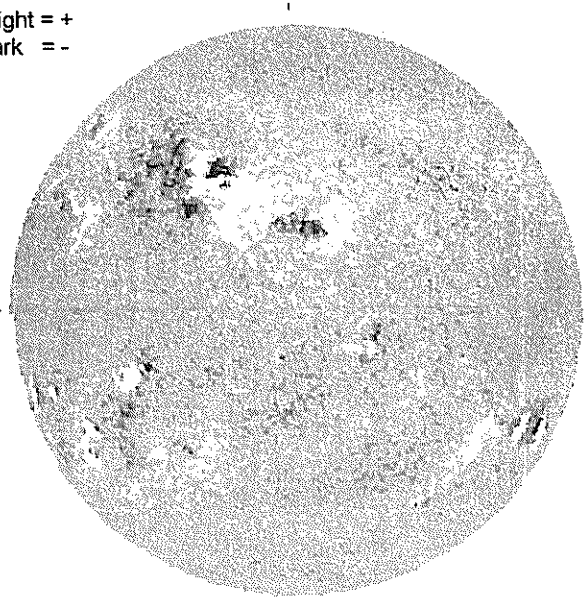
**APRIL 8, 1999 ( P= -26.29, Bo = -6.15, Lo = 307.68)**

KITT PEAK MAGNETOGRAM

N

**868.8 nm**

Bright = +
Dark = -



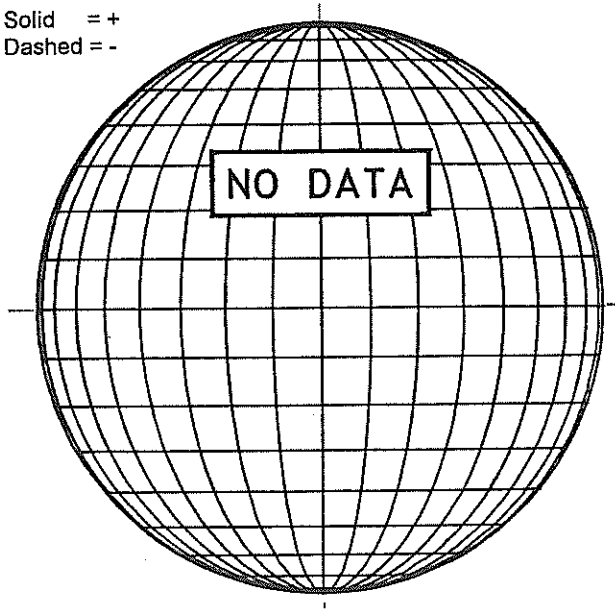
E-

1649 UT

STANFORD MAGNETOGRAM

N

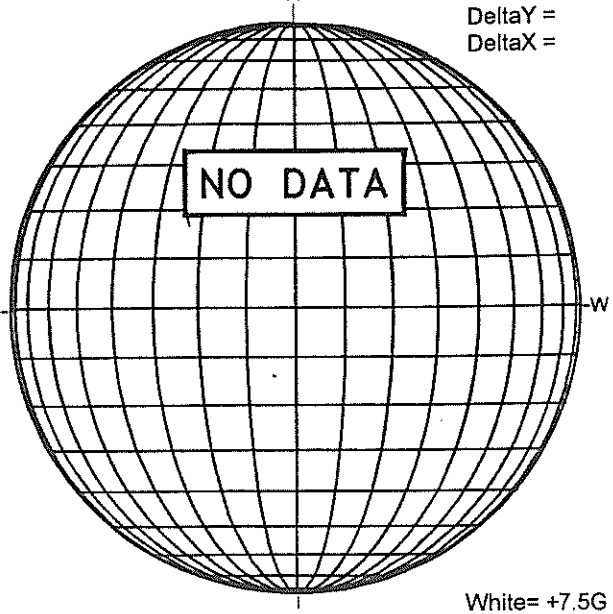
Solid = +
Dashed = -




MT. WILSON MAGNETOGRAM

N

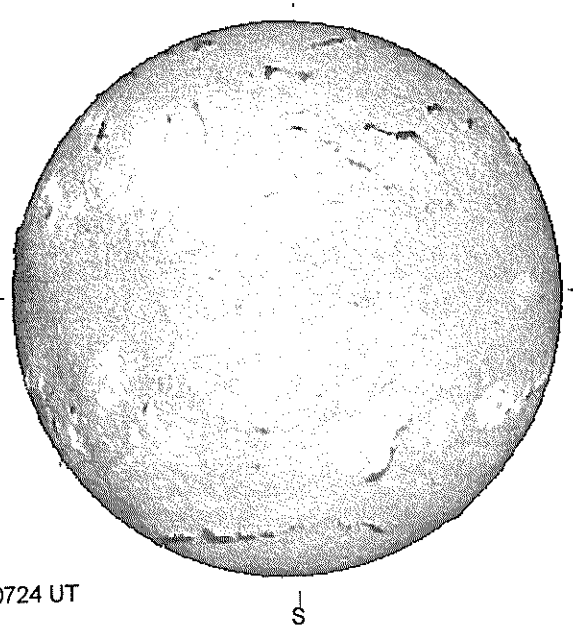
DeltaY =
DeltaX =




W

White= +7.5G
Black = -7.5G

MEUDON H-ALPHA

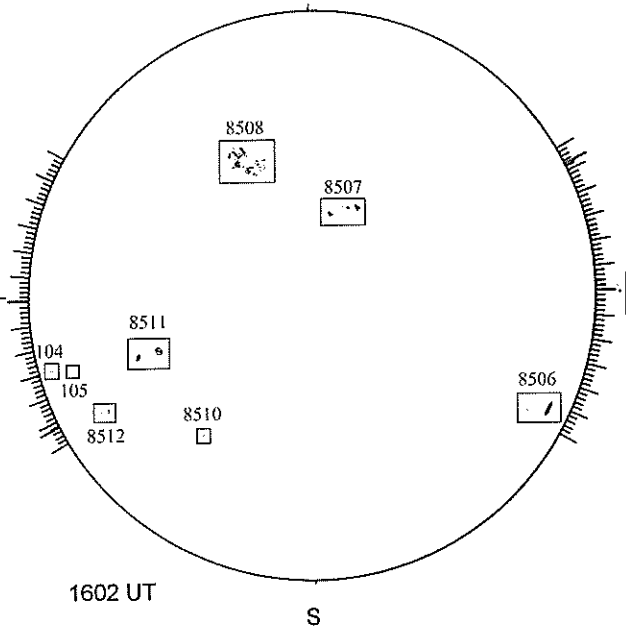


E-

0724 UT

S

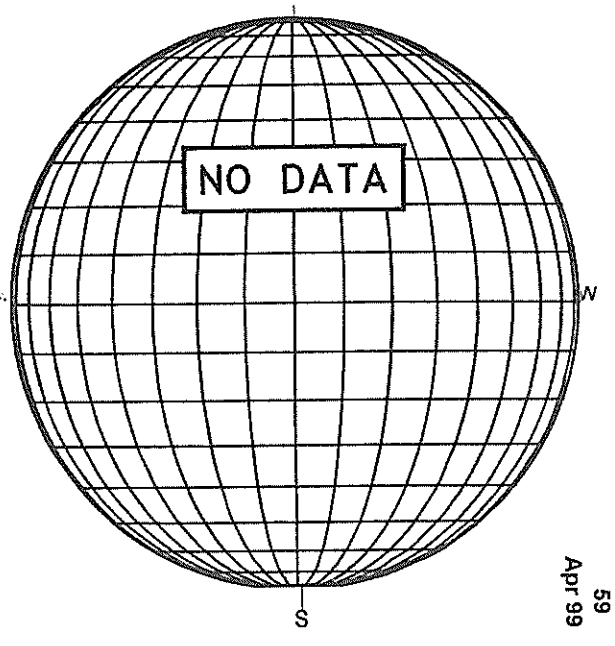
RAMEY SUNSPOT




1602 UT

S

SACRAMENTO PEAK CORONA (1.15 Radii)----




W

S

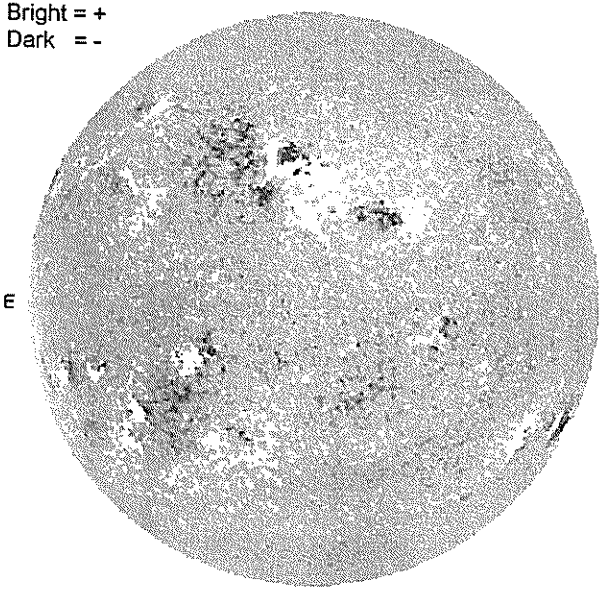
APRIL 9, 1999 ( P= -26.28, Bo = -6.08, Lo = 294.48)

Apr 99 60

KITT PEAK MAGNETOGRAM

N **868.8 nm

Bright = +
Dark = -



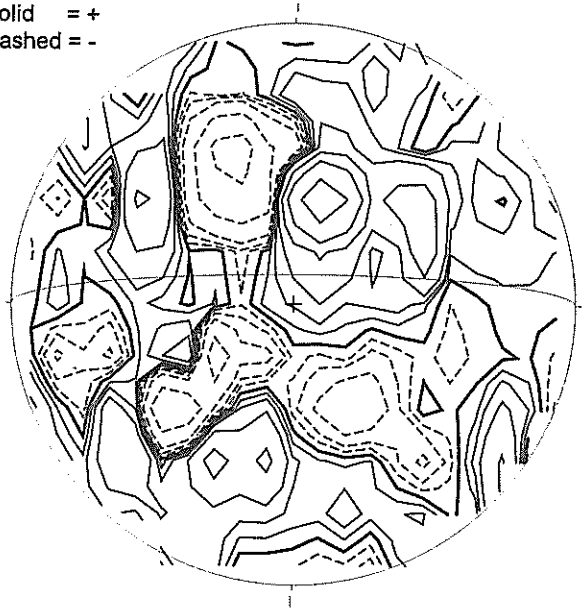
E

1507 UT

STANFORD MAGNETOGRAM

N

Solid = +
Dashed = -

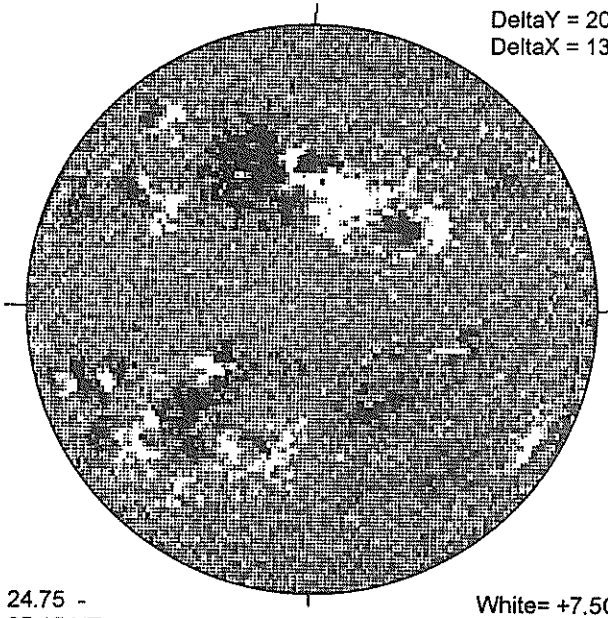


2239 UT

MT. WILSON MAGNETOGRAM

N

DeltaY = 20.2
DeltaX = 13.0



W

24.75 -
25.15 UT

White= +7.5G
Black = -7.5G

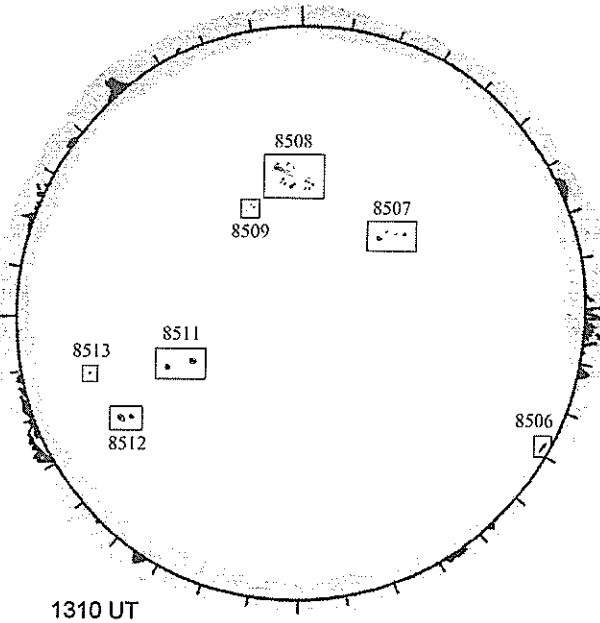
MEUDON H-ALPHA

E-

0704 UT

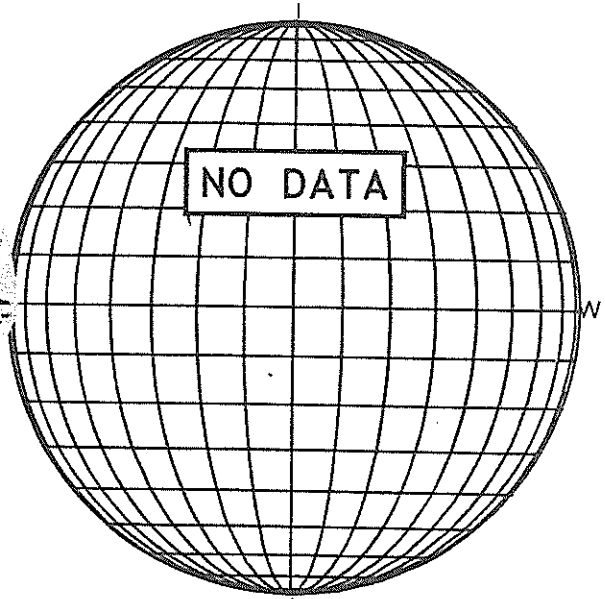
S

RAMEY SUNSPOT




1310 UT
0522 UT LOMN Prom S

SACRAMENTO PEAK CORONA (1.15 Radii)

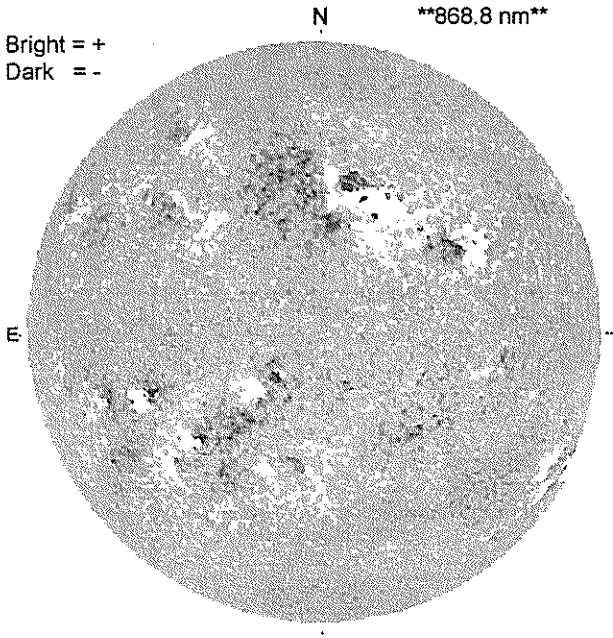



W

S

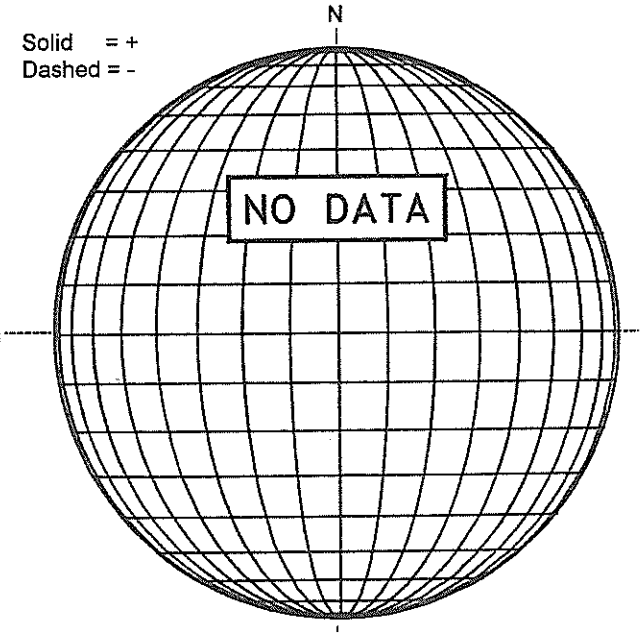
**APRIL 10, 1999 ( P= -26.27, Bo = -6.01, Lo = 281.28)**

KITT PEAK MAGNETOGRAM

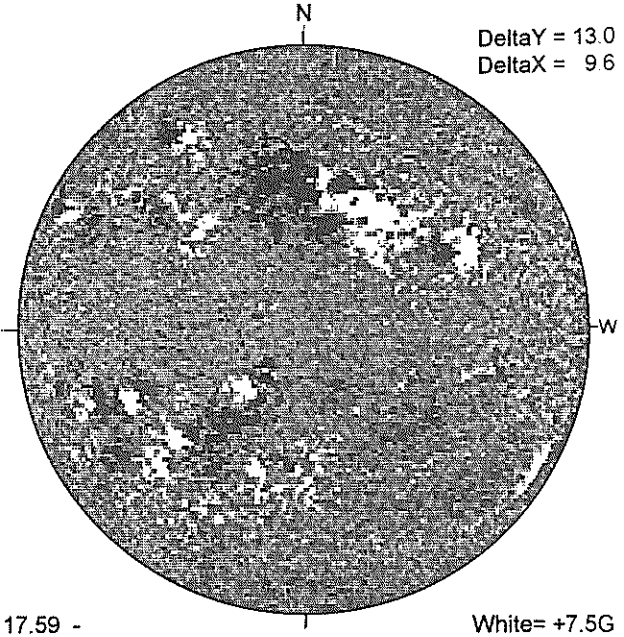



1559 UT

STANFORD MAGNETOGRAM



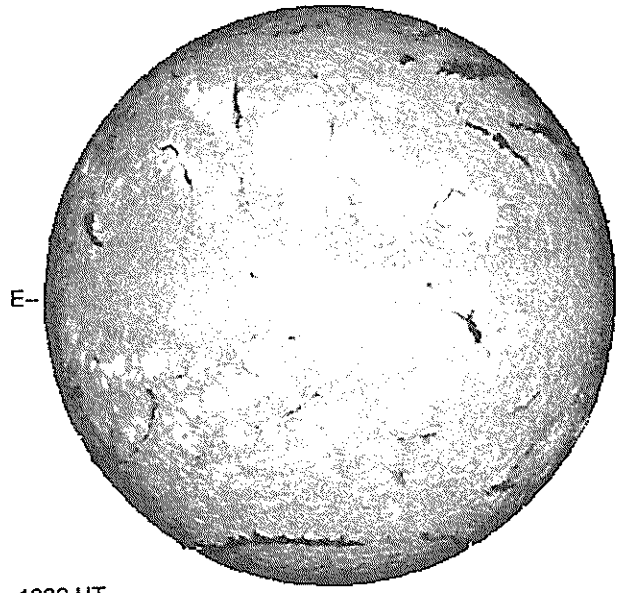

MT. WILSON MAGNETOGRAM




17.59 -
18.53 UT

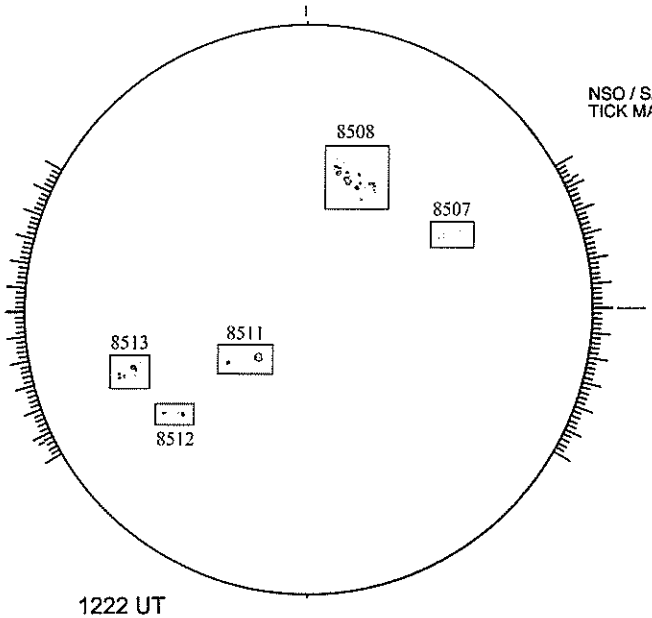
White= +7.5G
Black = -7.5G

MEUDON H-ALPHA



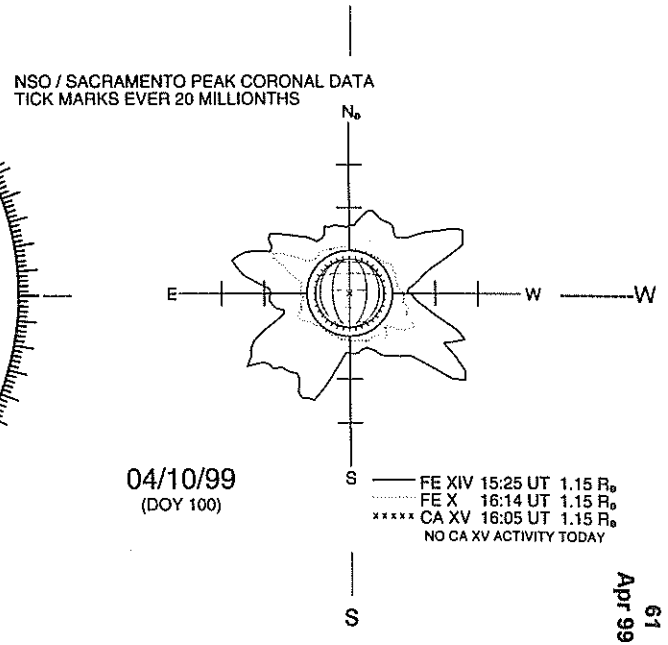

1330 UT

RAMEY SUNSPOT



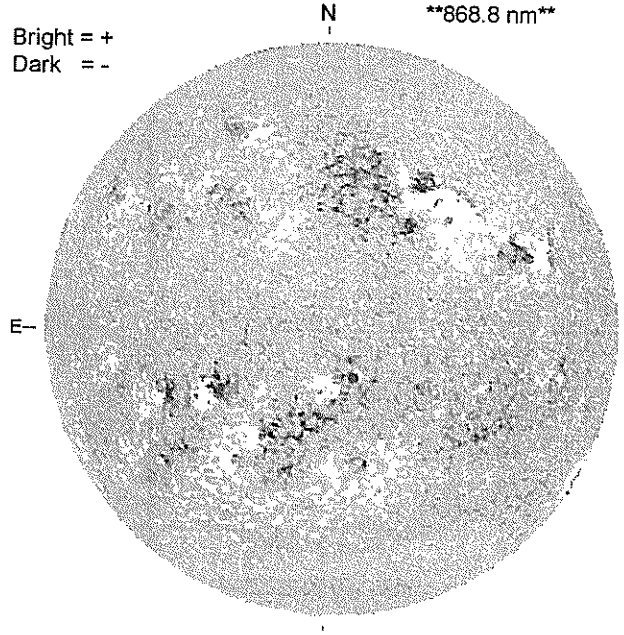

1222 UT

SACRAMENTO PEAK CORONA (1.15 Radii)

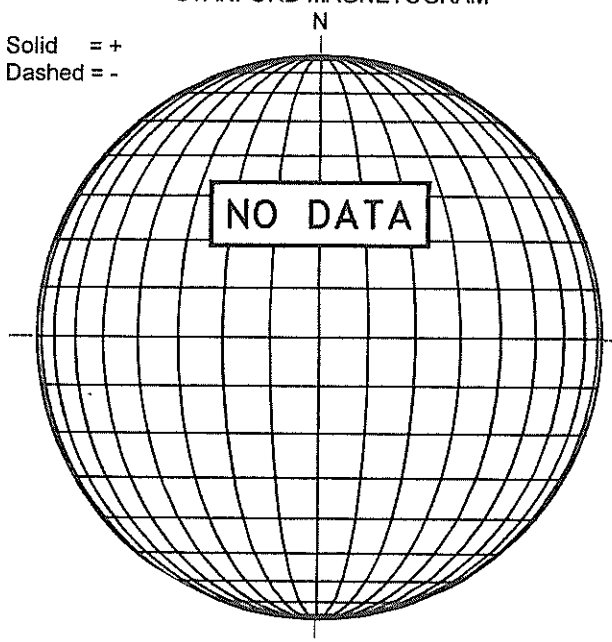


**APRIL 11, 1999 ( P= -26.24 Bo = -5.94, Lo = 268.08)**

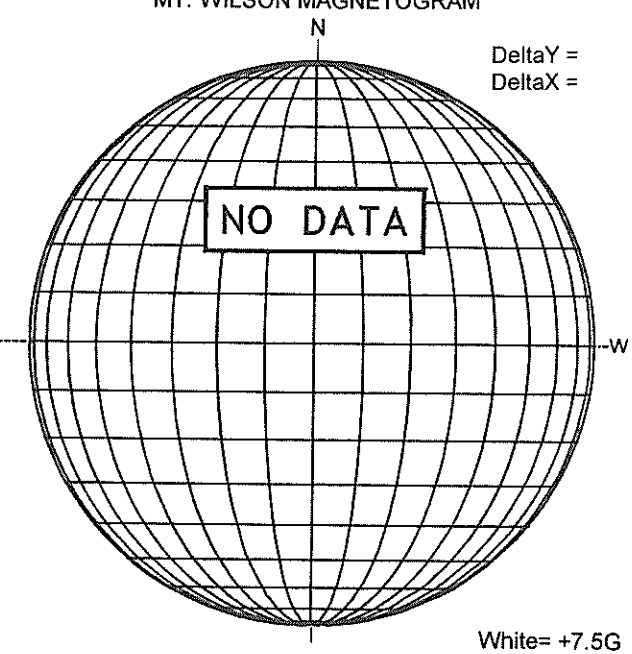
KITT PEAK MAGNETOGRAM



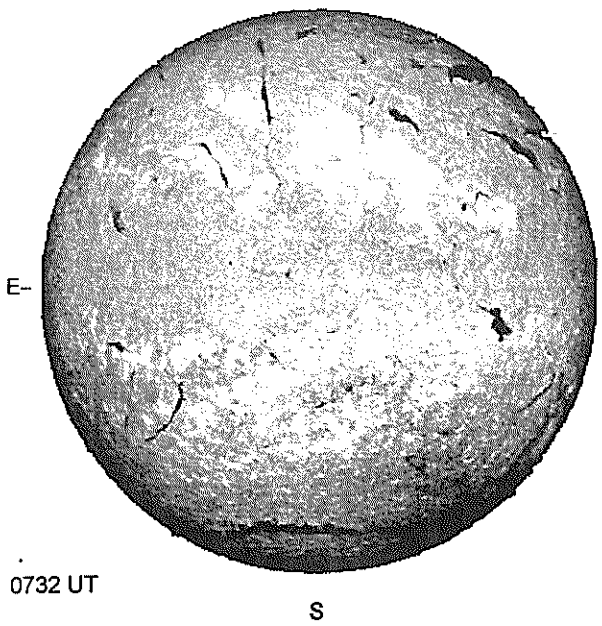

STANFORD MAGNETOGRAM



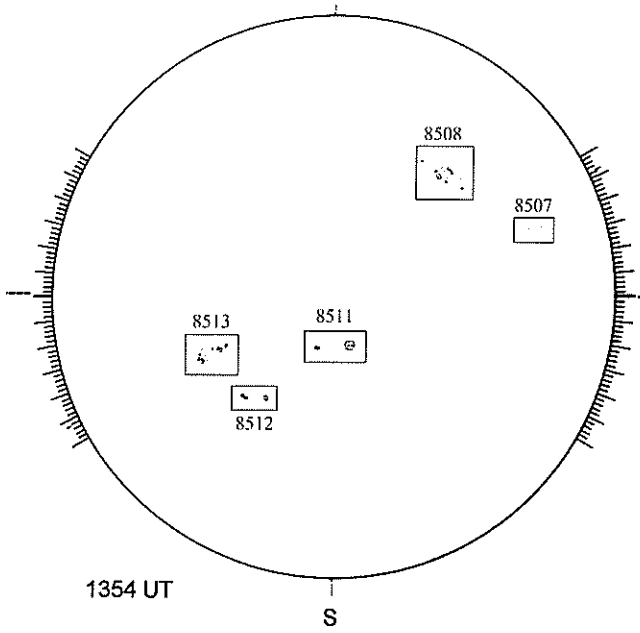

MT. WILSON MAGNETOGRAM



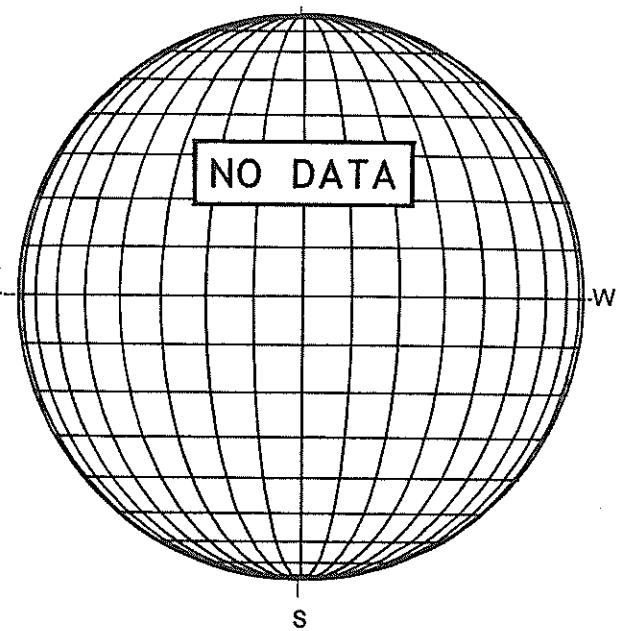

MEUDON H-ALPHA




RAMEY SUNSPOT

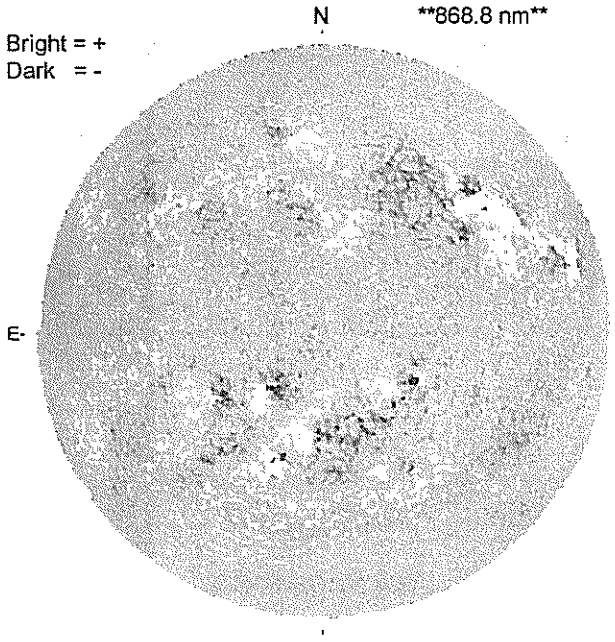



SACRAMENTO PEAK CORONA (1.15 Radii)



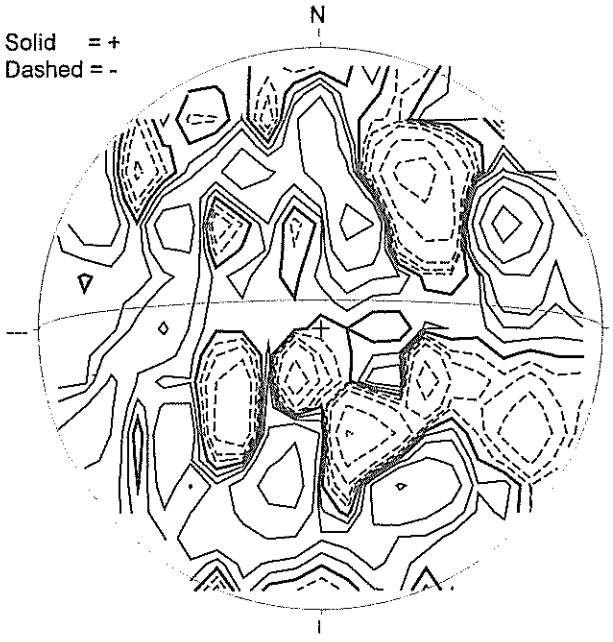
**APRIL 12, 1999 ( P= -26.21, Bo = -5.87, Lo = 254.88)**

KITT PEAK MAGNETOGRAM



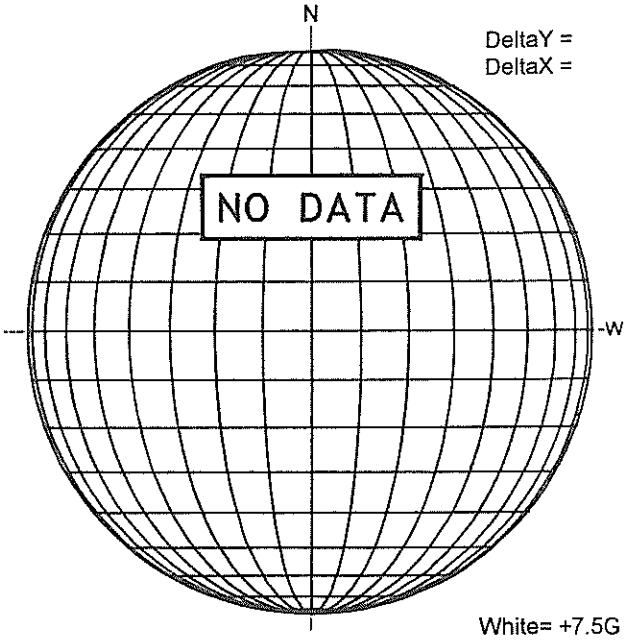

1625 UT

STANFORD MAGNETOGRAM



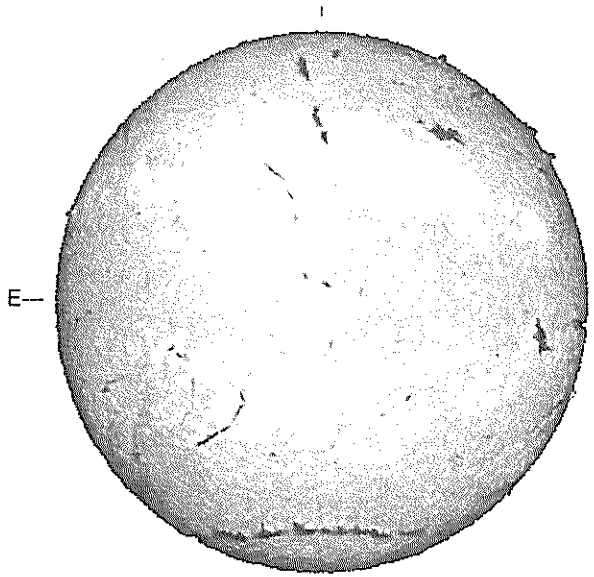

2202 UT

MT. WILSON MAGNETOGRAM




White= +7.5G
Black = -7.5G

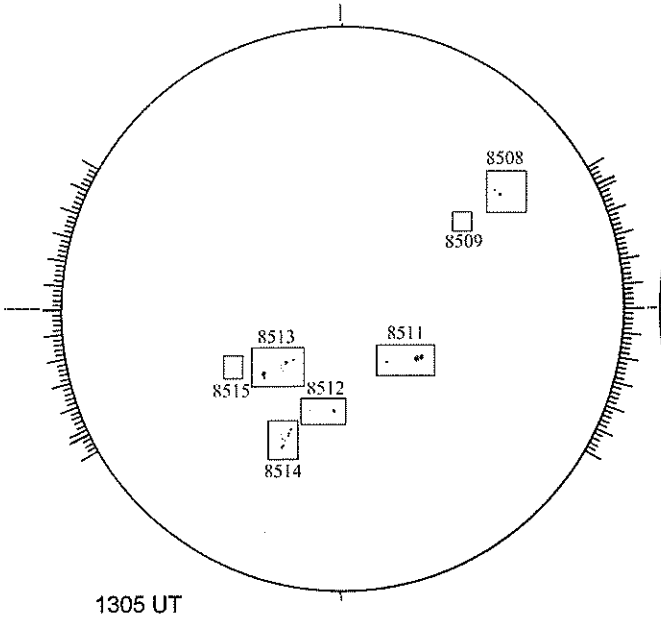
MEUDON H-ALPHA




0904 UT

S

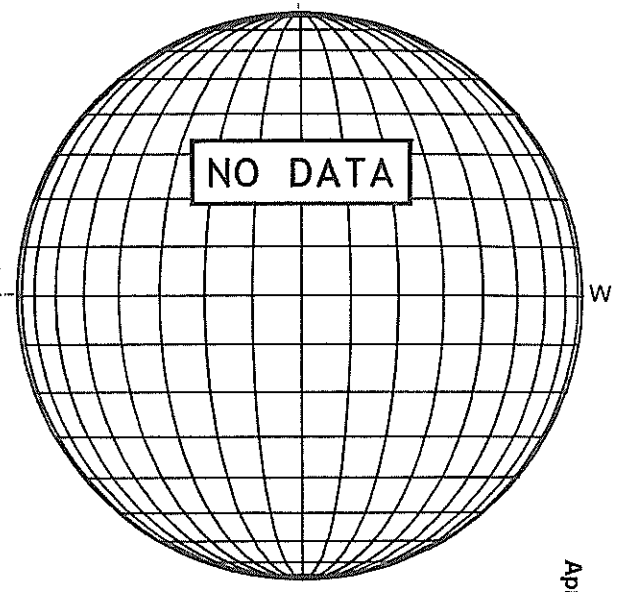
RAMEY SUNSPOT




1305 UT

S

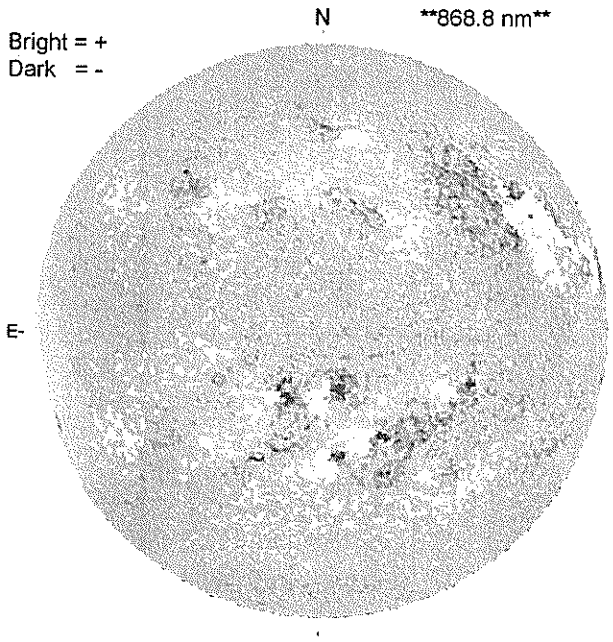
SACRAMENTO PEAK CORONA (1.15 Radii)----




S

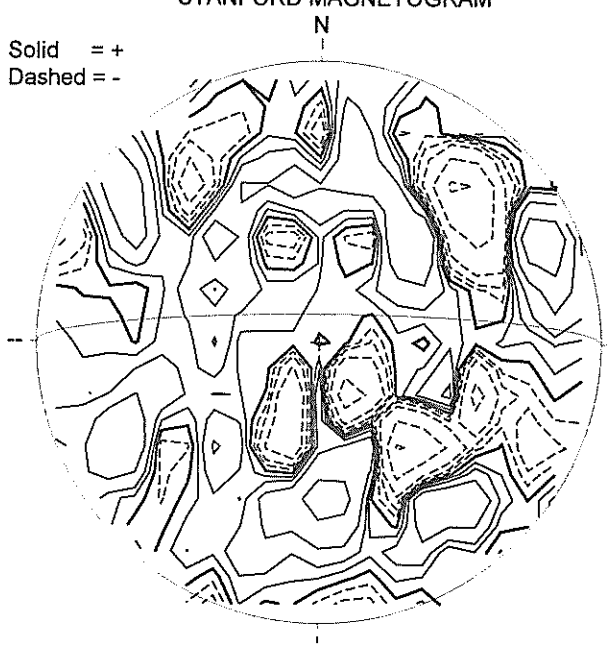
**APRIL 13, 1999 ( P= -26.17, Bo = -5.79, Lo = 241.68)**

KITT PEAK MAGNETOGRAM



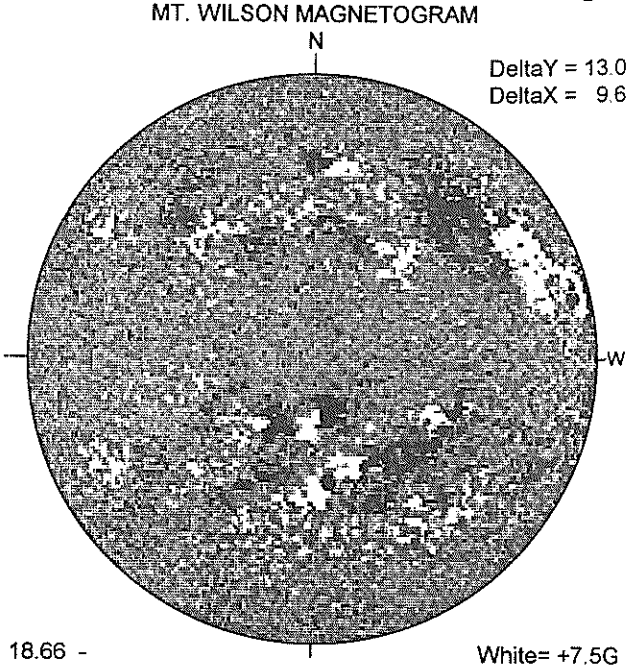

1839 UT

STANFORD MAGNETOGRAM




2136 UT

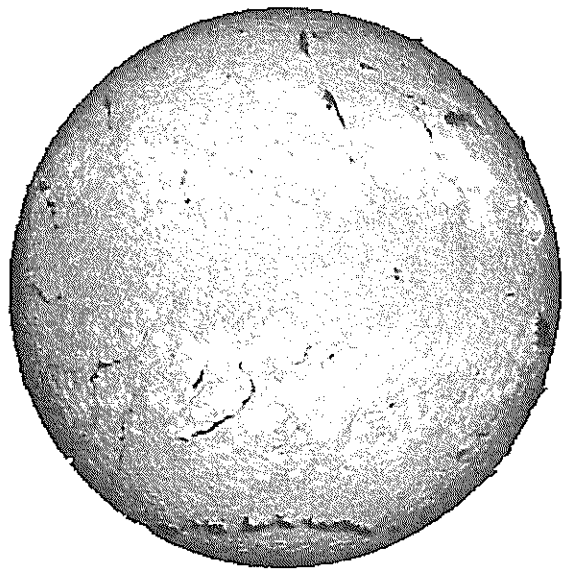
MT. WILSON MAGNETOGRAM




18.66 -
19.60 UT

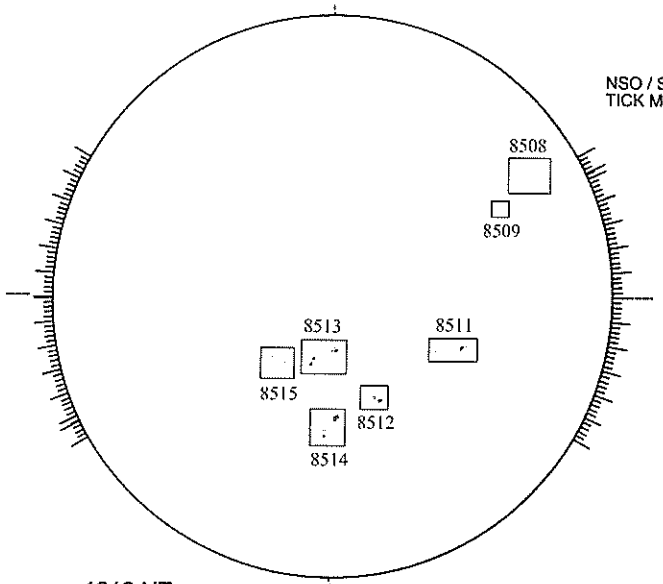
White= +7.5G
Black = -7.5G

MEUDON H-ALPHA



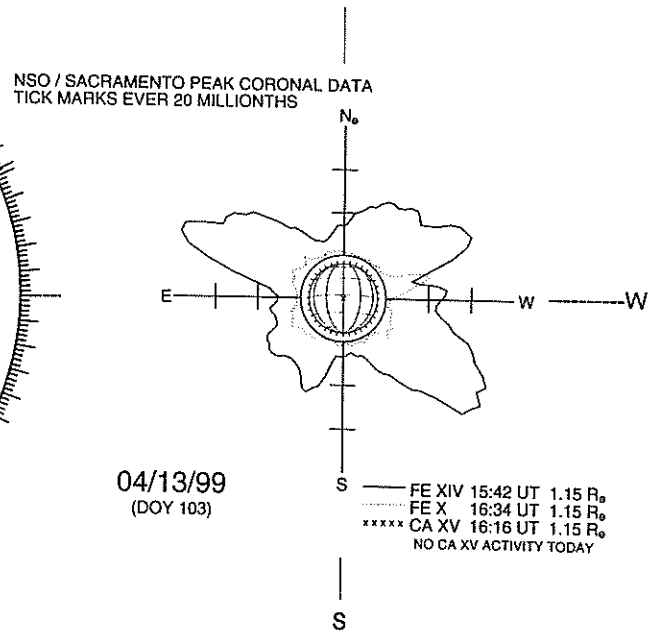

0744 UT

RAMEY SUNSPOT



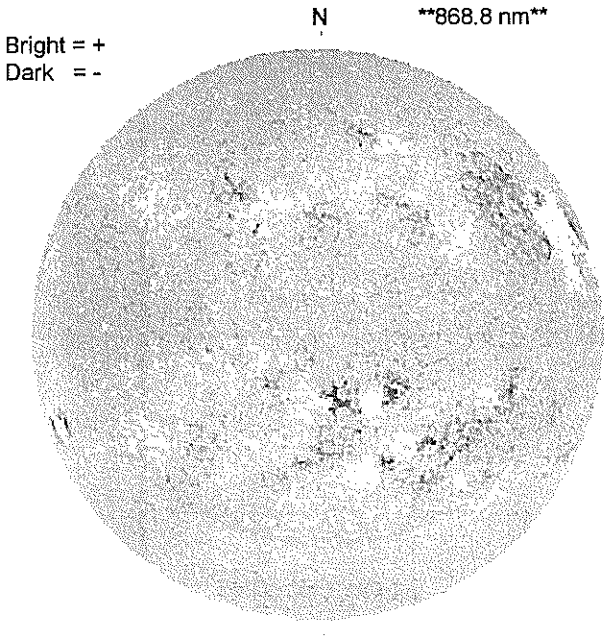

1219 UT

SACRAMENTO PEAK CORONA (1.15 Radii)----



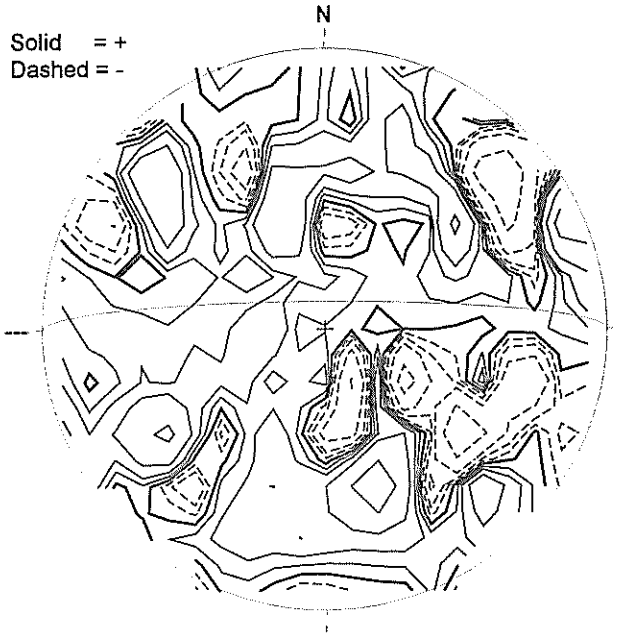
**APRIL 14, 1999 ( P= -26.13, Bo = -5.72, Lo = 228.48)**

KITT PEAK MAGNETOGRAM



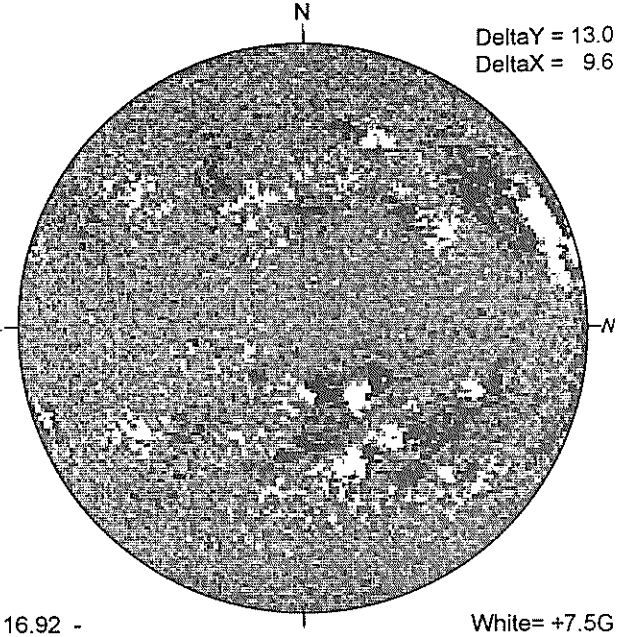

1615 UT

STANFORD MAGNETOGRAM




1815 UT

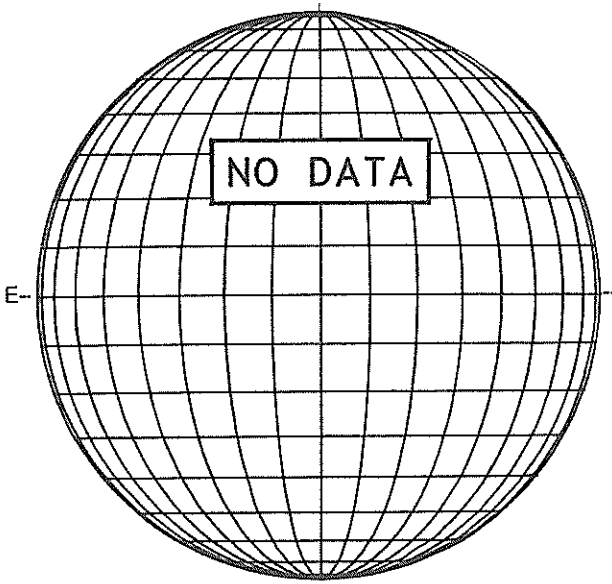
MT. WILSON MAGNETOGRAM



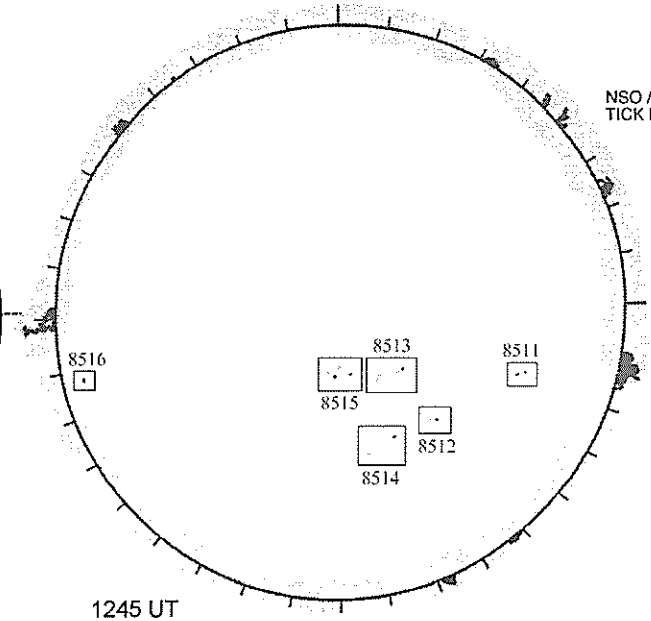

16.92 -
17.86 UT

White= +7.5G
Black = -7.5G

MEUDON H-ALPHA

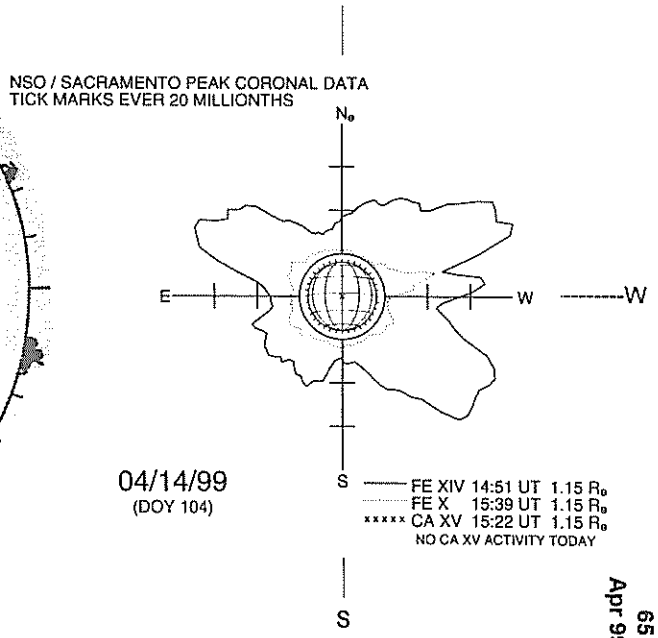



RAMEY SUNSPOT



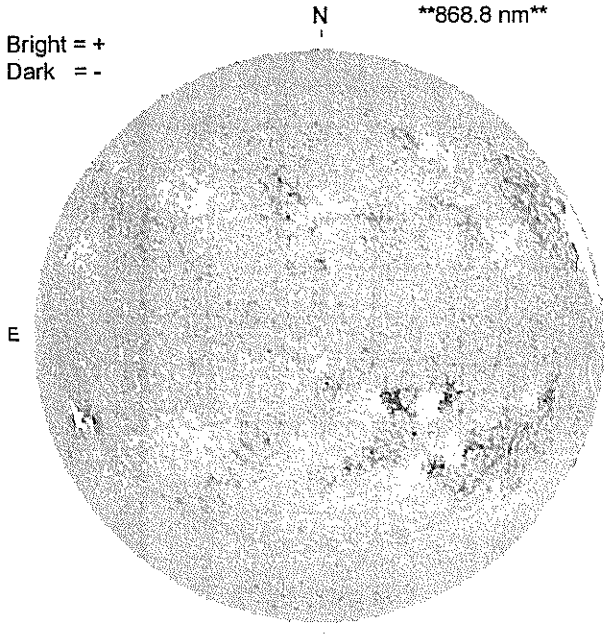

1245 UT
1018 UT LOMN Prom S

SACRAMENTO PEAK CORONA (1.15 Radii)----



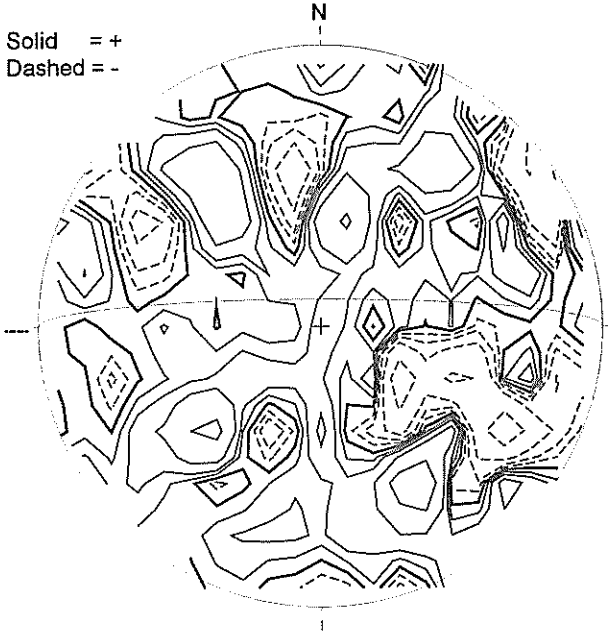
**APRIL 15, 1999 ( P= -26.08, Bo = -5.64, Lo = 215.28)**

KITT PEAK MAGNETOGRAM



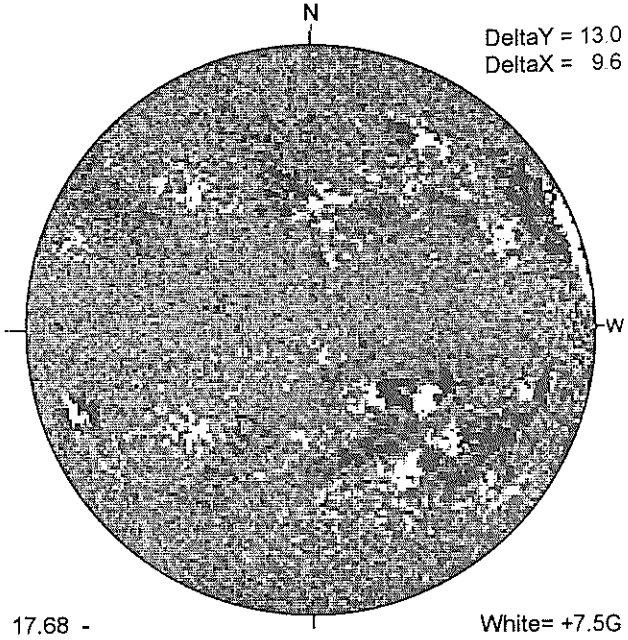

1420 UT

STANFORD MAGNETOGRAM



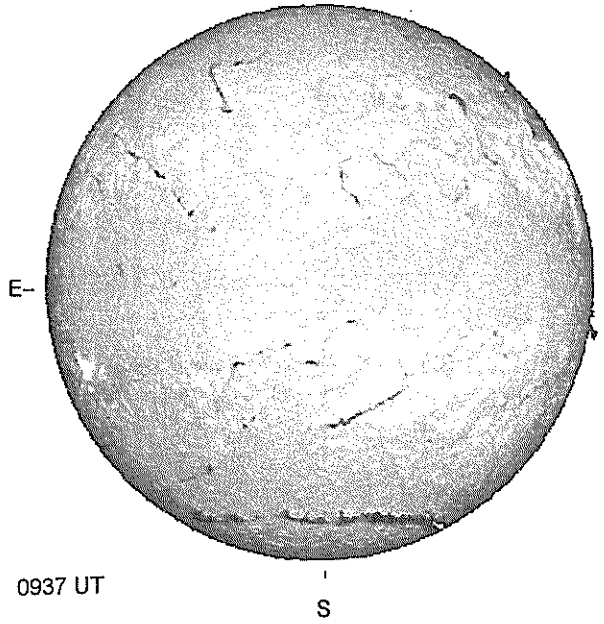

1842 UT

MT. WILSON MAGNETOGRAM



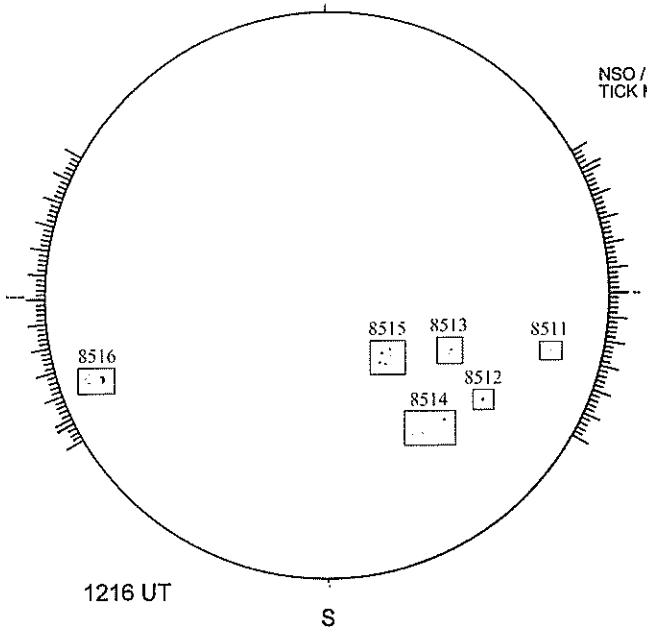

17.68 -
18.62 UT

MEUDON H-ALPHA



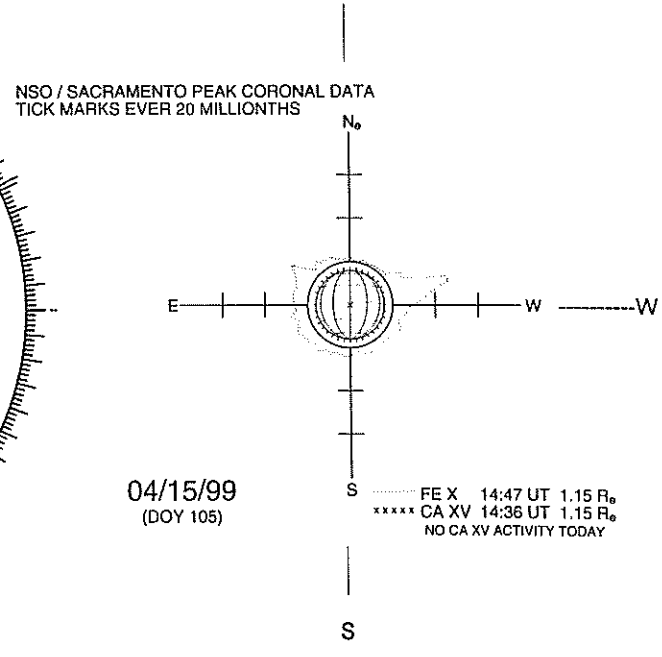

0937 UT

RAMEY SUNSPOT




1216 UT

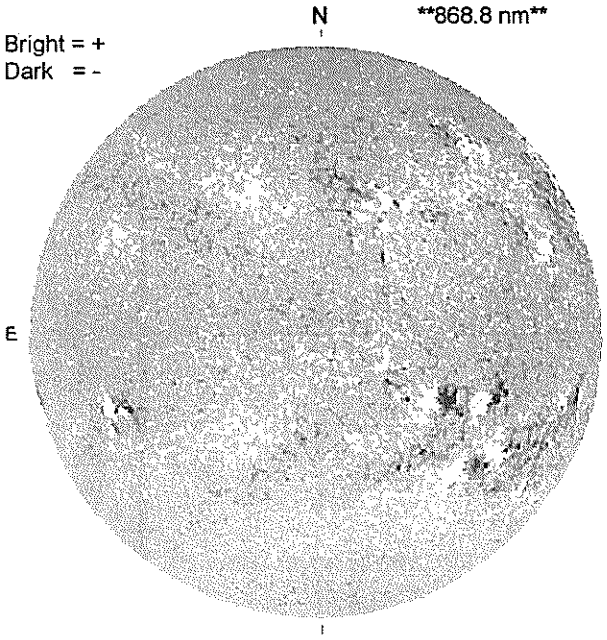
SACRAMENTO PEAK CORONA (1.15 Radii)----



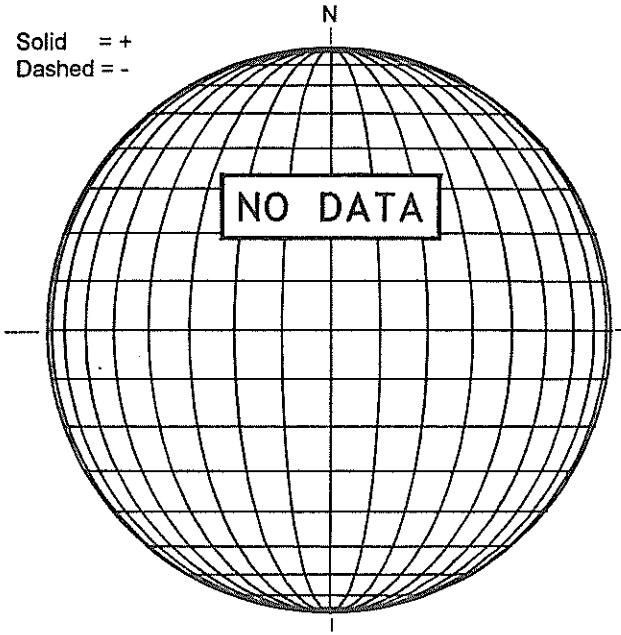

04/15/99
(DOY 105)

**APRIL 16, 1999 ( P= -26.02, Bo = -5.56, Lo = 202.07)**

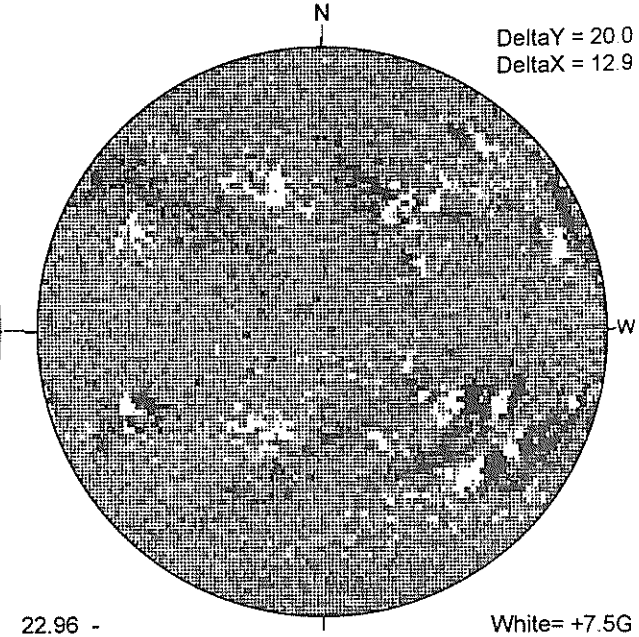
KITT PEAK MAGNETOGRAM



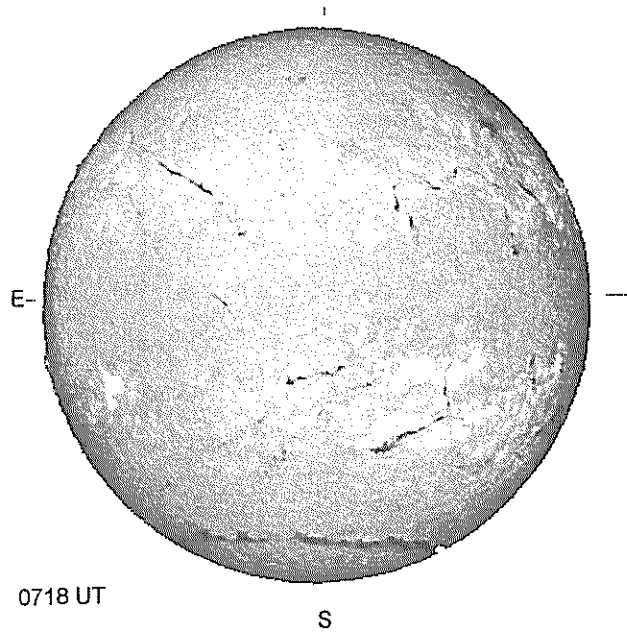

STANFORD MAGNETOGRAM



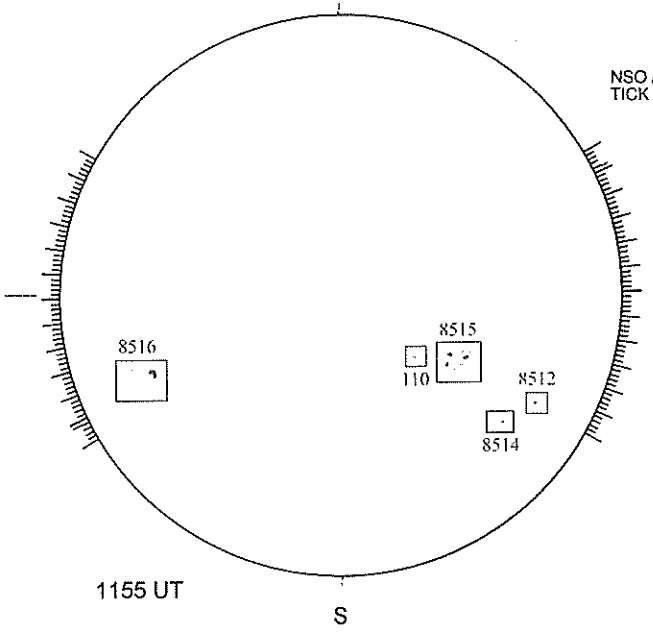

MT. WILSON MAGNETOGRAM



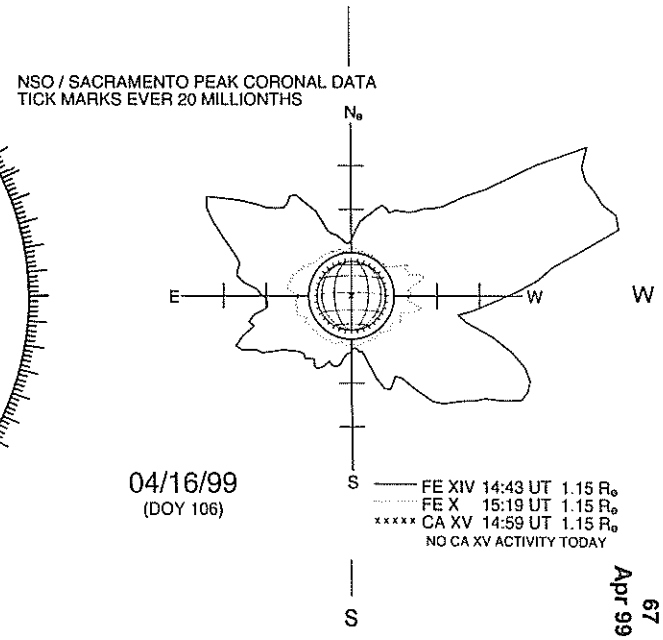

MEUDON H-ALPHA




RAMEY SUNSPOT




SACRAMENTO PEAK CORONA (1.15 Radii)----

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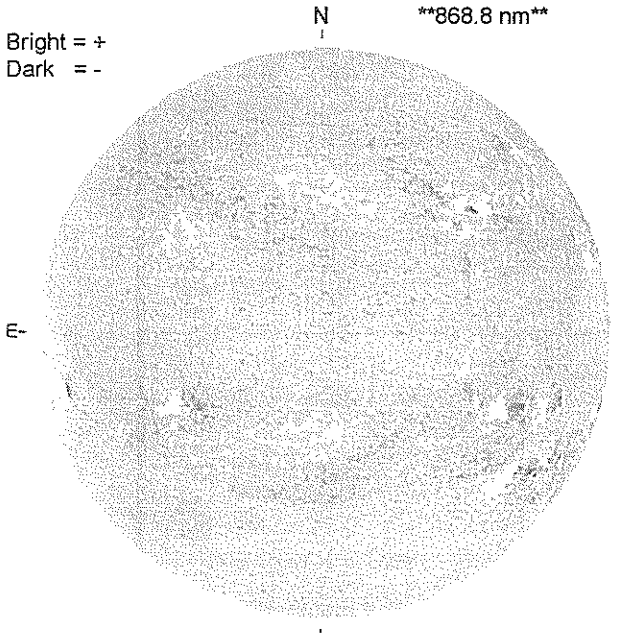
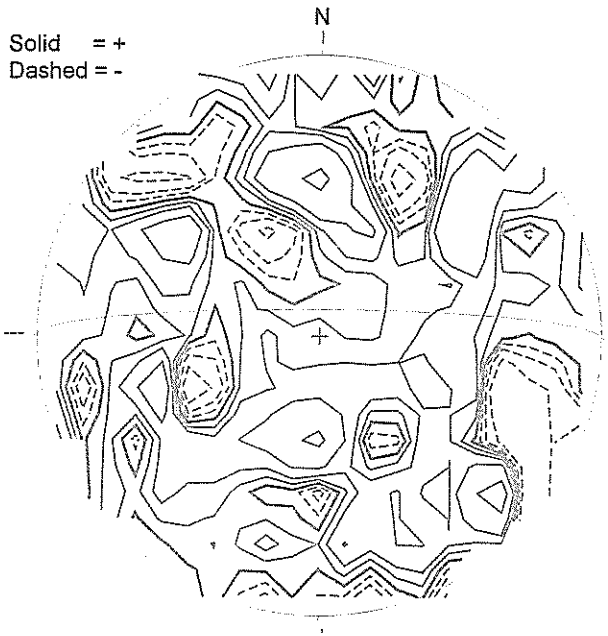
# APRIL 17, 1999 ( P= -25.95, Bo = -5.48, Lo = 188.87)

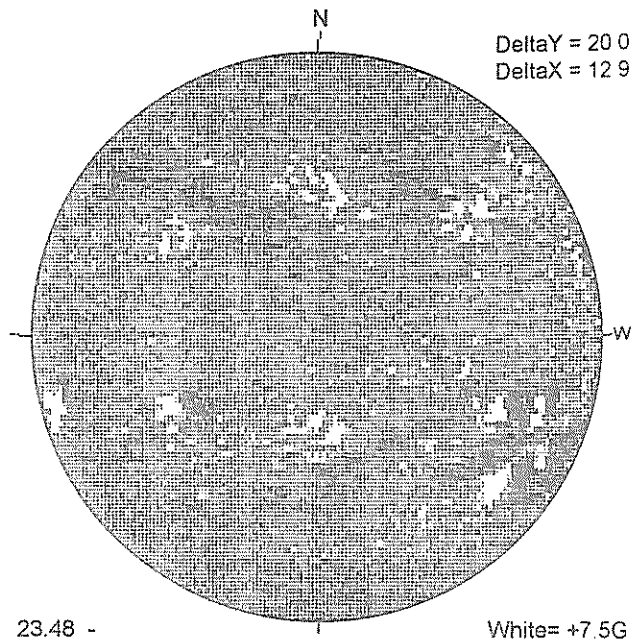
## KITT PEAK MAGNETOGRAM



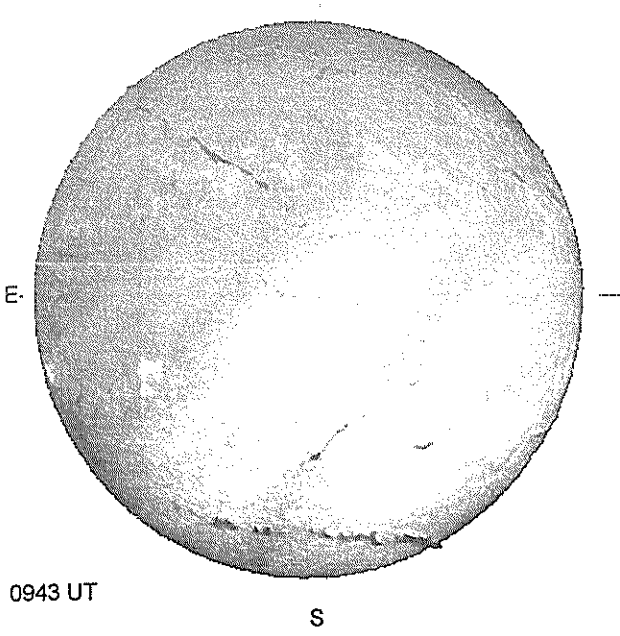

## STANFORD MAGNETOGRAM



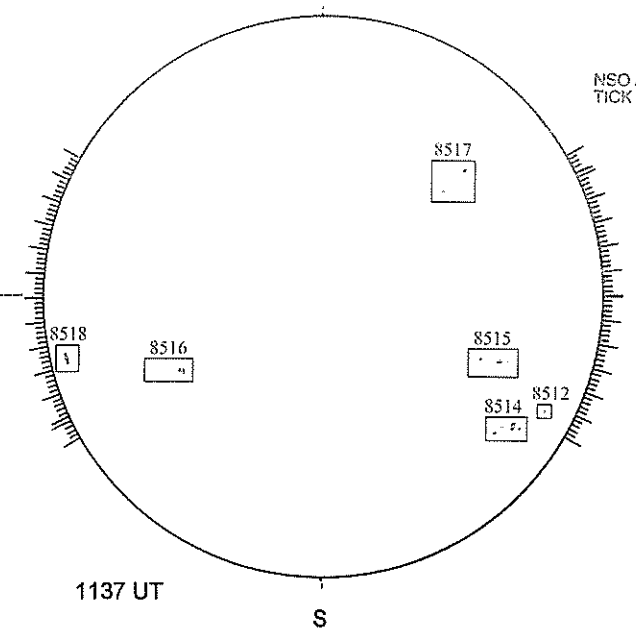

## MT. WILSON MAGNETOGRAM



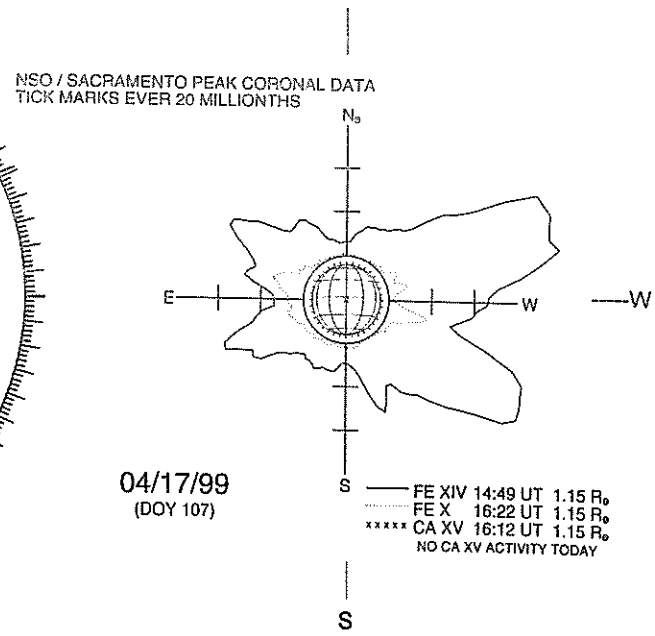

## MEUDON H-ALPHA




## RAMEY SUNSPOT

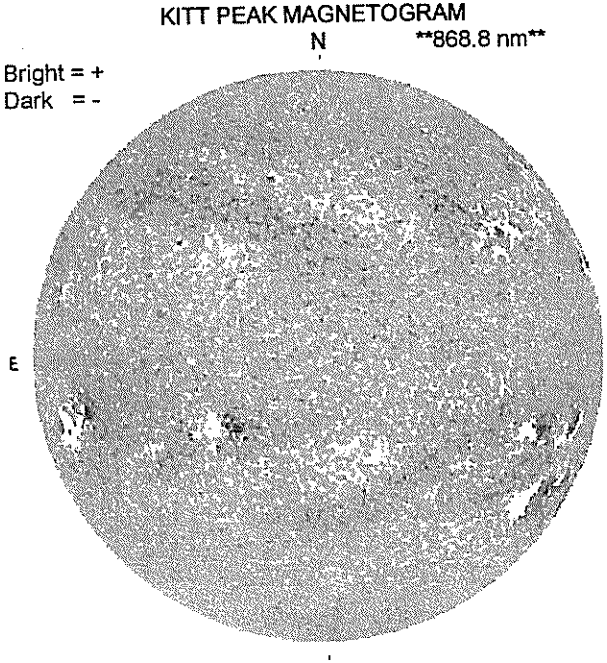



## SACRAMENTO PEAK CORONA (1.15 Radii)



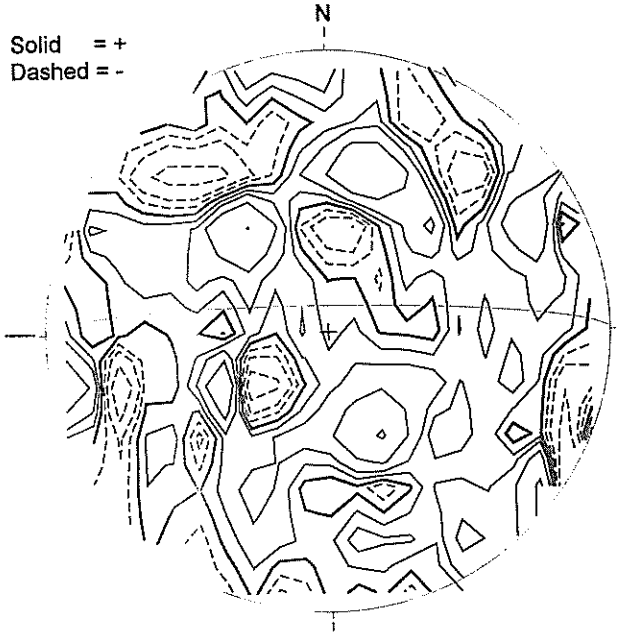
**APRIL 18, 1999 ( P= -25.87, Bo = -5.40, Lo = 175.66)**

KITT PEAK MAGNETOGRAM



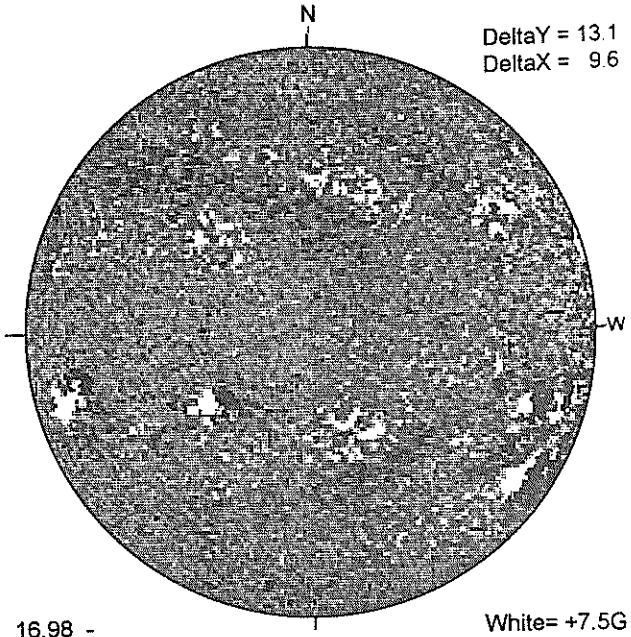

1441 UT

STANFORD MAGNETOGRAM



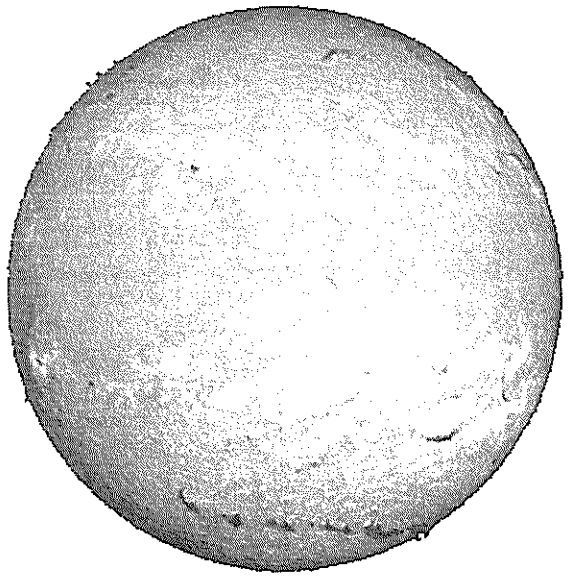

2042 UT

MT. WILSON MAGNETOGRAM



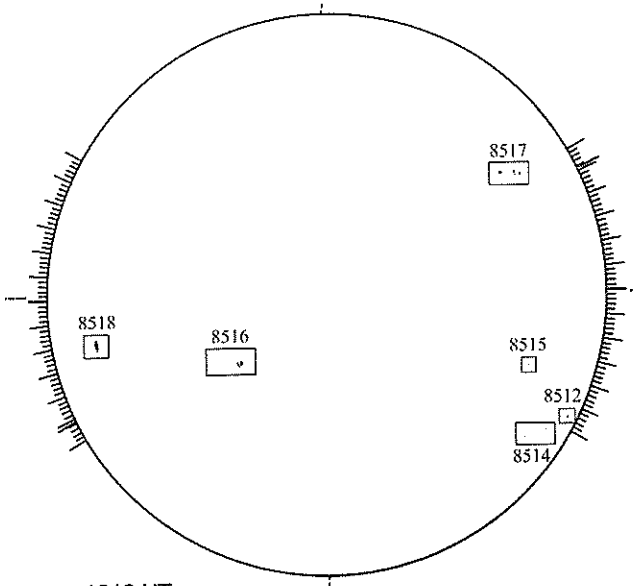

16.98 -
17.91 UT

MEUDON H-ALPHA



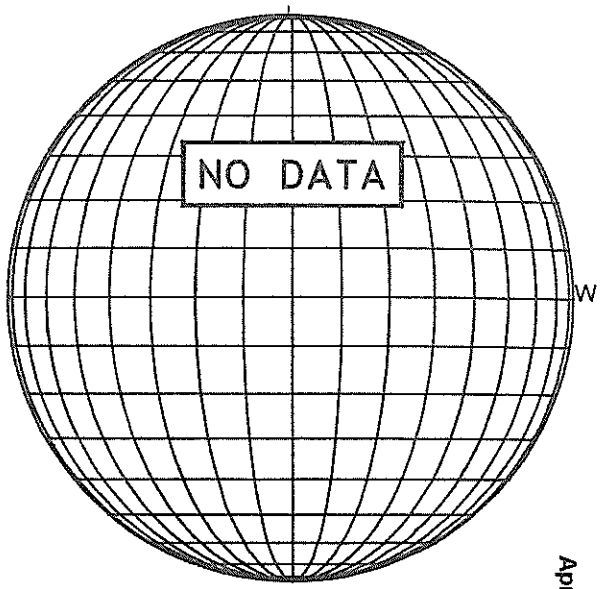

0810 UT

RAMEY SUNSPOT




1216 UT

LOMNICKY PEAK CORONA (1.04 Radii)----

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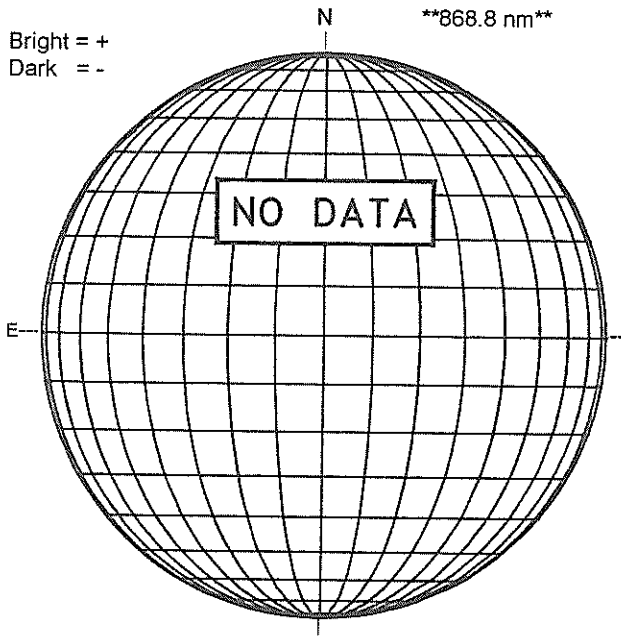
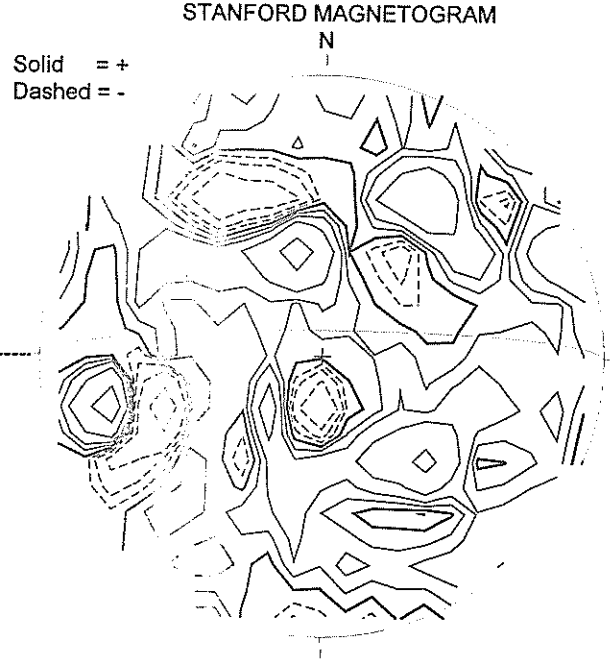
# APRIL 19, 1999 ( P= -25.79, Bo = -5.32, Lo = 162.46)

## KITT PEAK MAGNETOGRAM

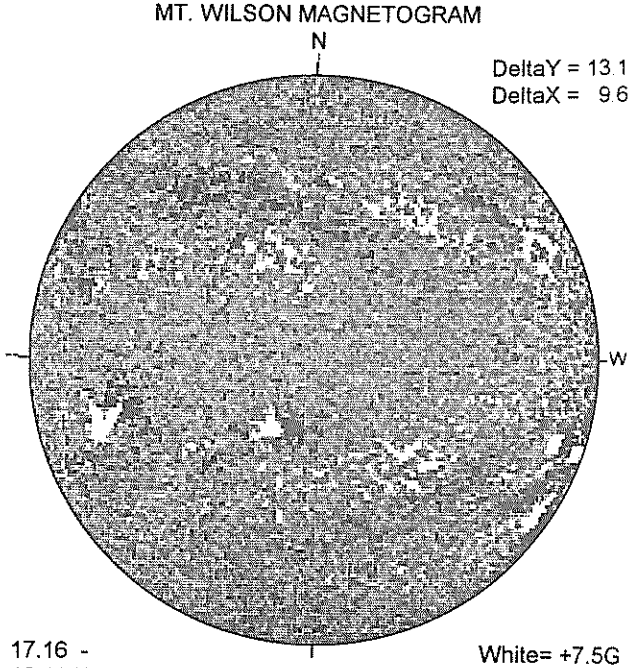



## STANFORD MAGNETOGRAM




2028 UT

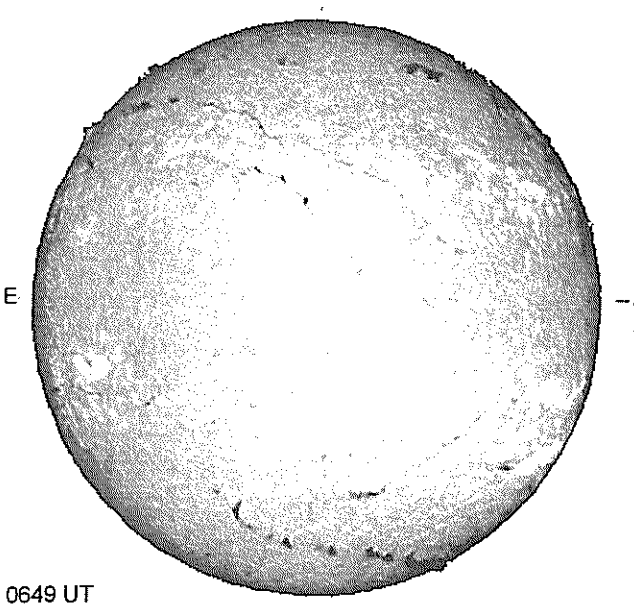
## MT. WILSON MAGNETOGRAM




17.16 -
18.10 UT

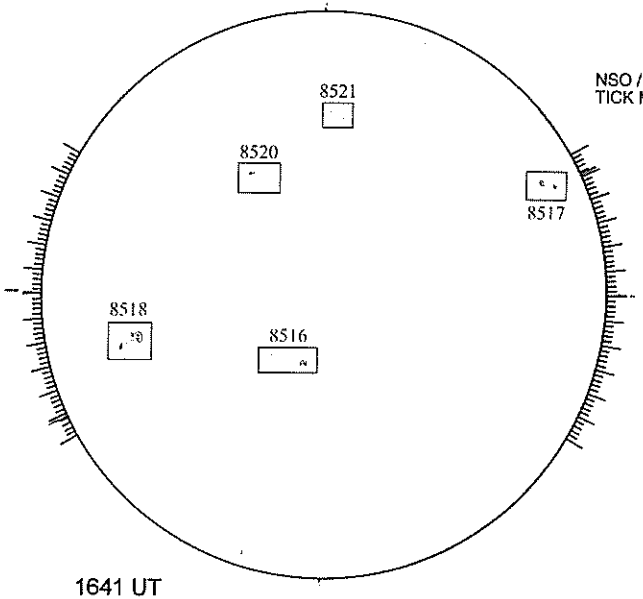
White= +7.5G
Black = -7.5G

## MEUDON H-ALPHA



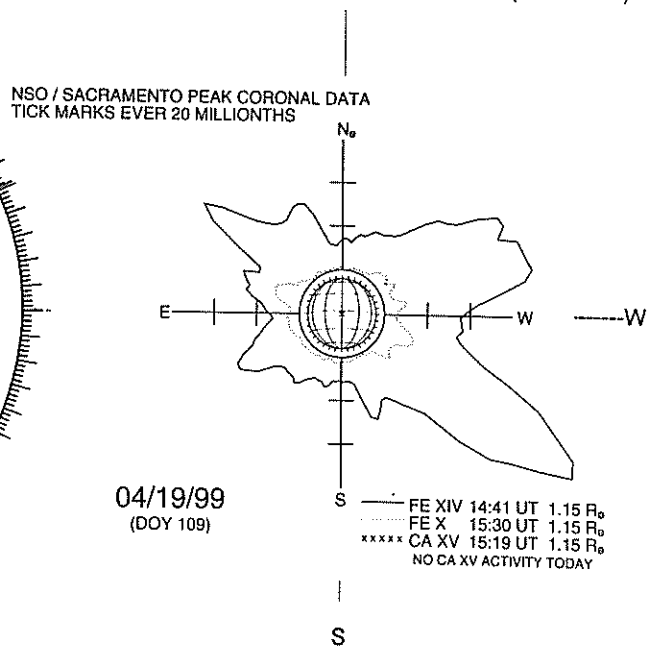

0649 UT

## RAMEY SUNSPOT



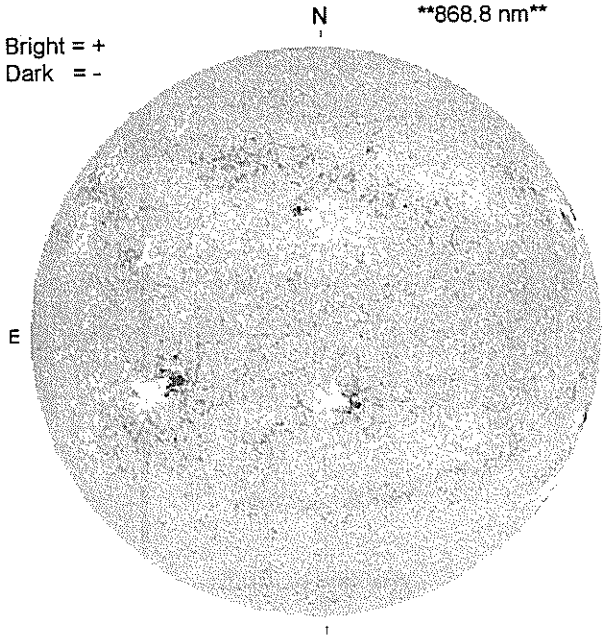

1641 UT

## SACRAMENTO PEAK CORONA (1.15 Radii)



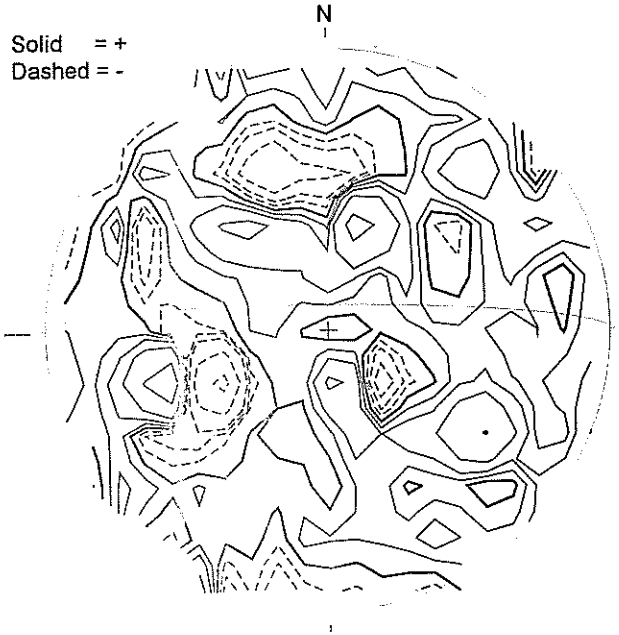
**APRIL 20, 1999 ( P= -25.70, Bo = -5.23, Lo = 149.25)**

KITT PEAK MAGNETOGRAM



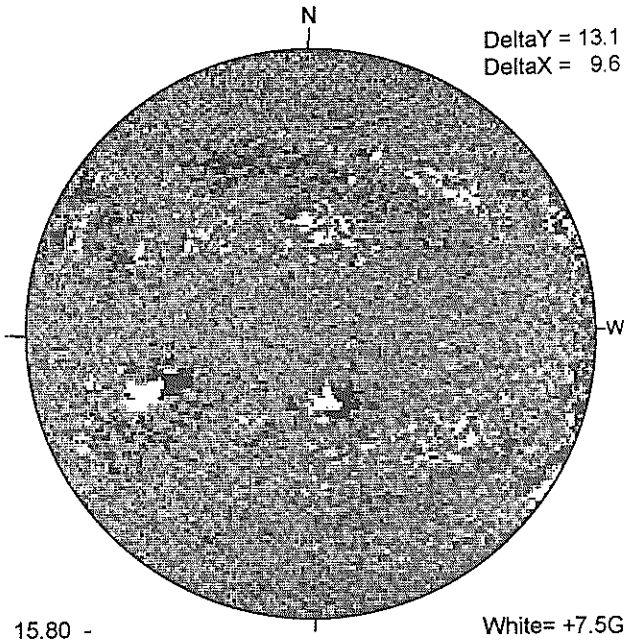

1540 UT

STANFORD MAGNETOGRAM




2034 UT

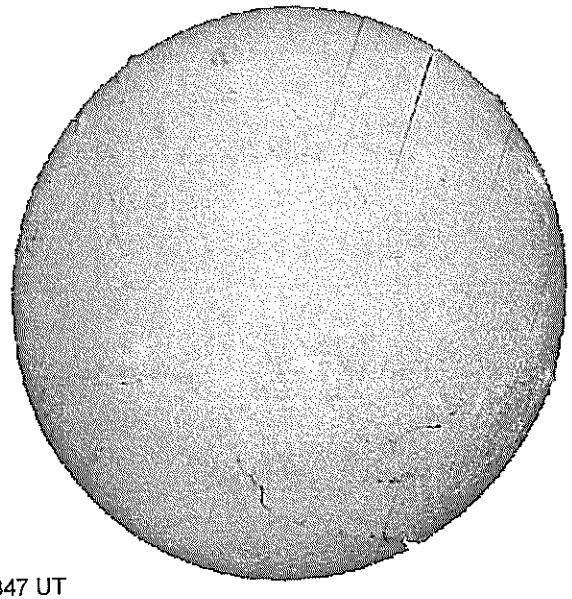
MT. WILSON MAGNETOGRAM




15.80 -
16.74 UT

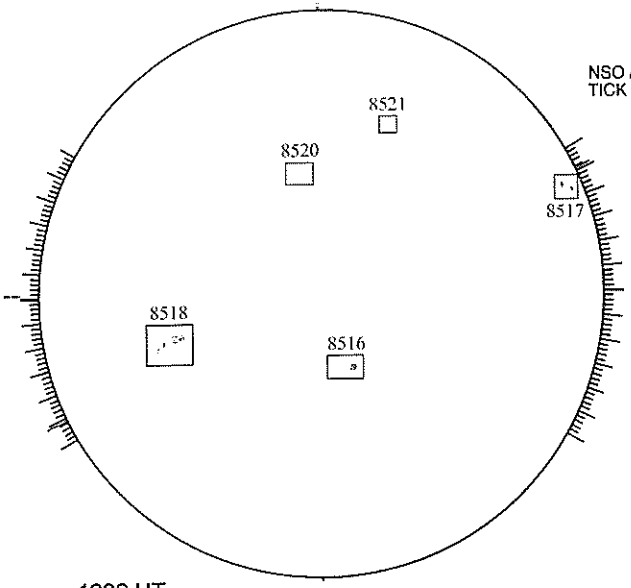
White= +7.5G
Black = -7.5G

SACRAMENTO PEAK H-ALPHA



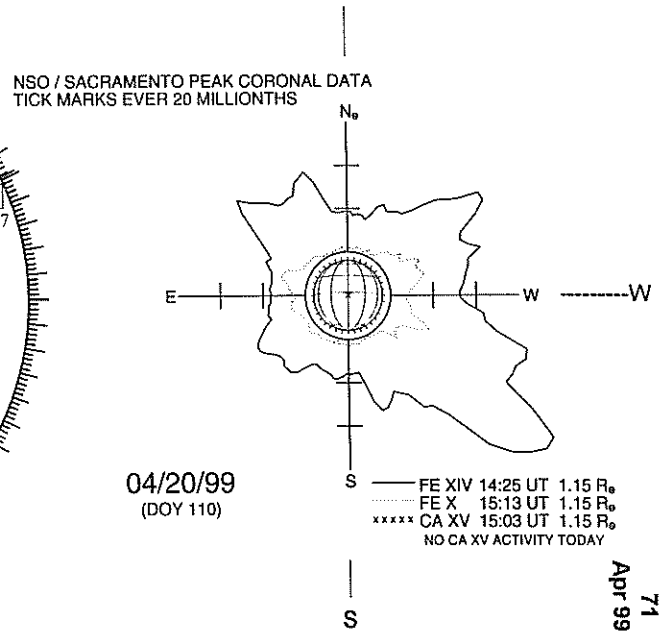

1347 UT

RAMEY SUNSPOT




1336 UT

SACRAMENTO PEAK CORONA (1.15 Radii)----

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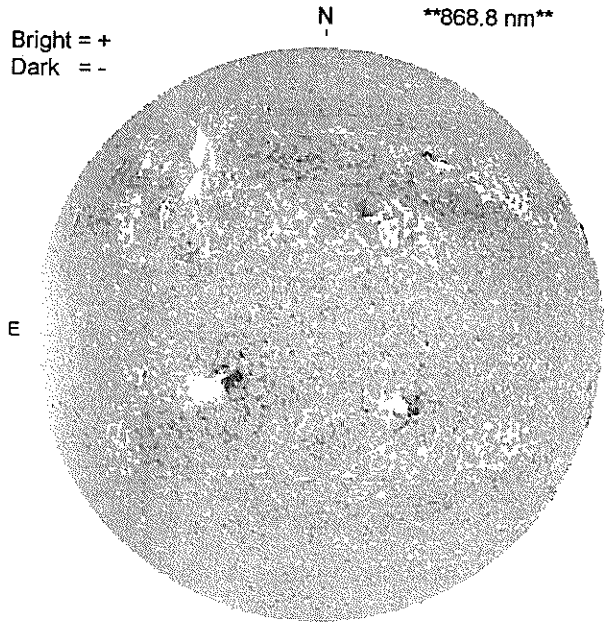
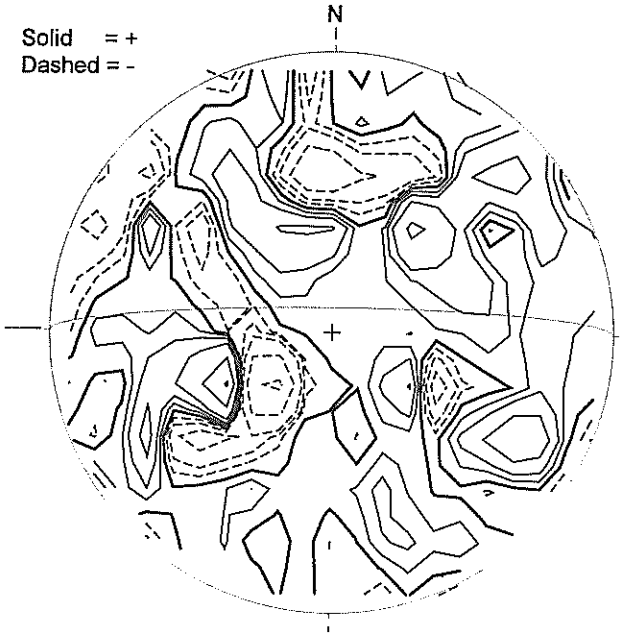
**APRIL 21, 1999 ( P= -25.60, Bo = -5.15, Lo = 136.04)**

KITT PEAK MAGNETOGRAM



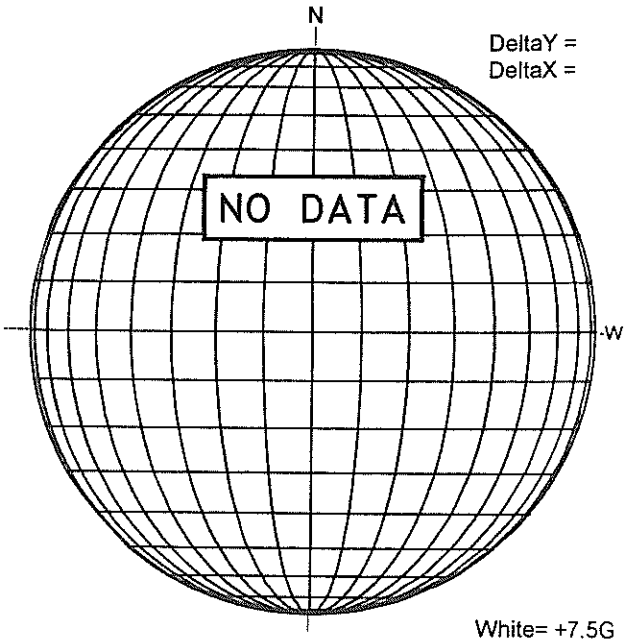

1601 UT

STANFORD MAGNETOGRAM



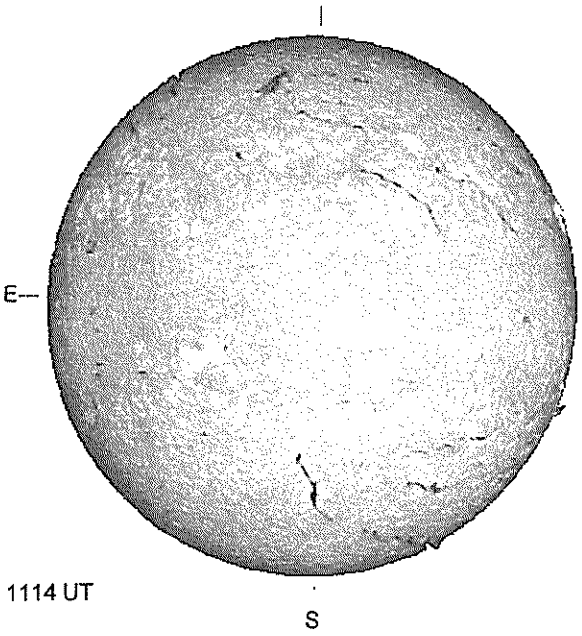

2006 UT

MT. WILSON MAGNETOGRAM



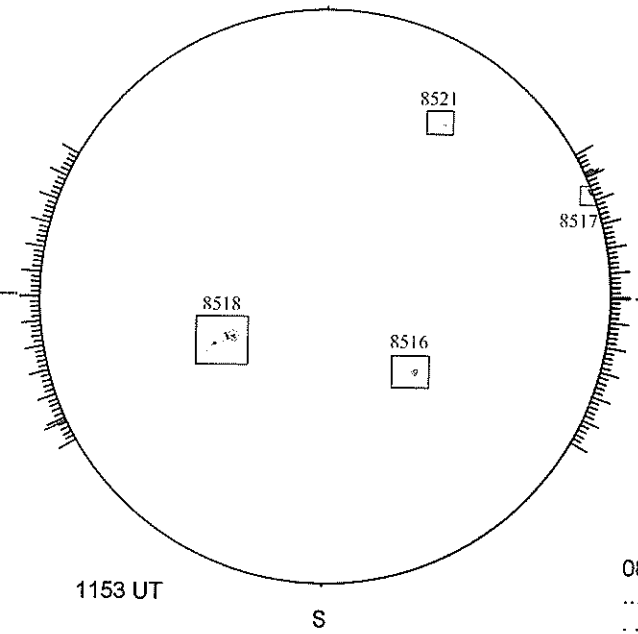

White= +7.5G
Black = -7.5G

MEUDON H-ALPHA



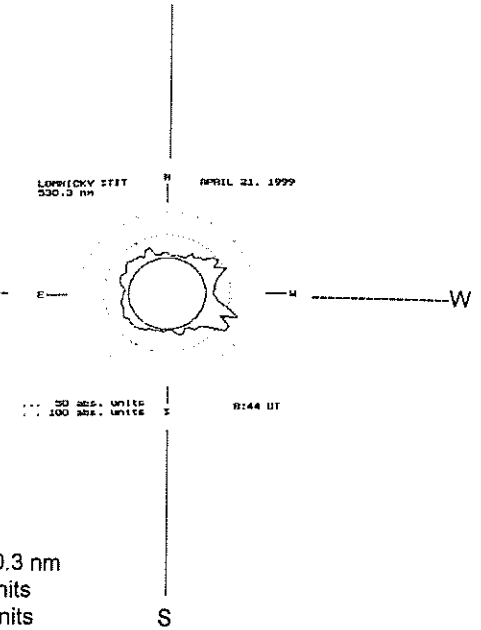

1114 UT

RAMEY SUNSPOT




1153 UT

LOMNICKY PEAK CORONA (1.04 Radii)



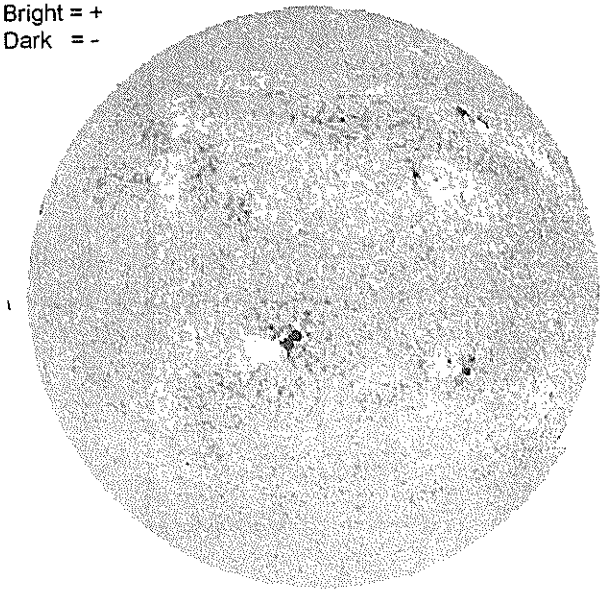

0844 UT, 530.3 nm
.... 50 abs. units
. . 100 abs. units

**APRIL 22, 1999 ( P= -25.50, Bo = -5.06, Lo = 122.84)**

KITT PEAK MAGNETOGRAM

N **868.8 nm**

Bright = +
Dark = -



1608 UT

STANFORD MAGNETOGRAM

N

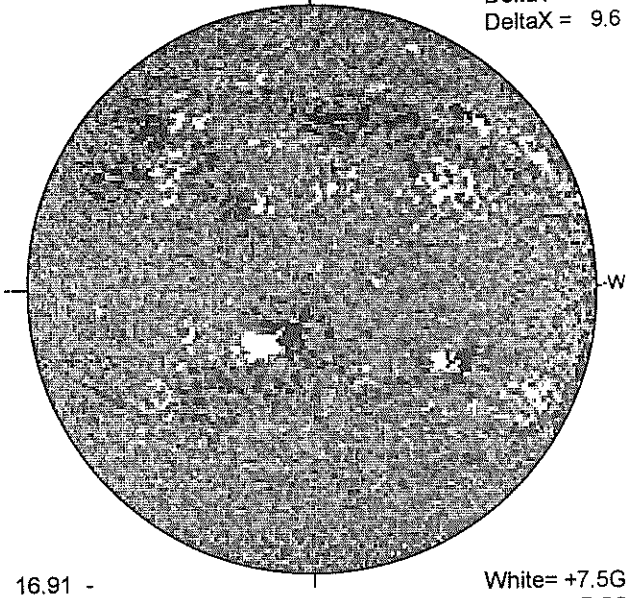
Solid = +
Dashed = -

1922 UT

MT. WILSON MAGNETOGRAM

N

DeltaY = 13.1
DeltaX = 9.6

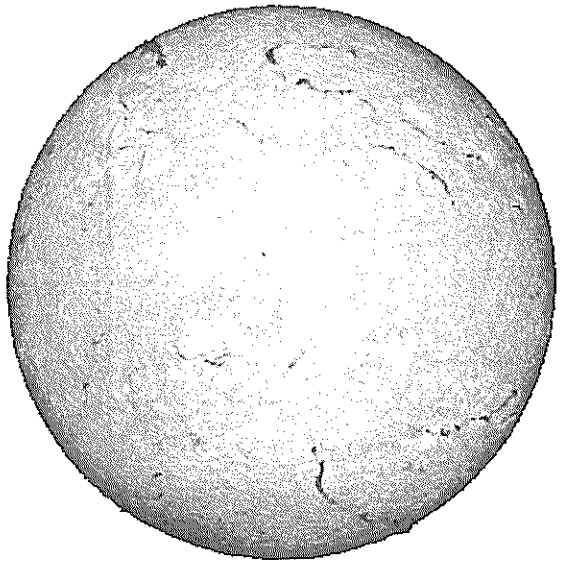


W

16.91 -
17.85 UT

White= +7.5G
Black = -7.5G

MEUDON H-ALPHA

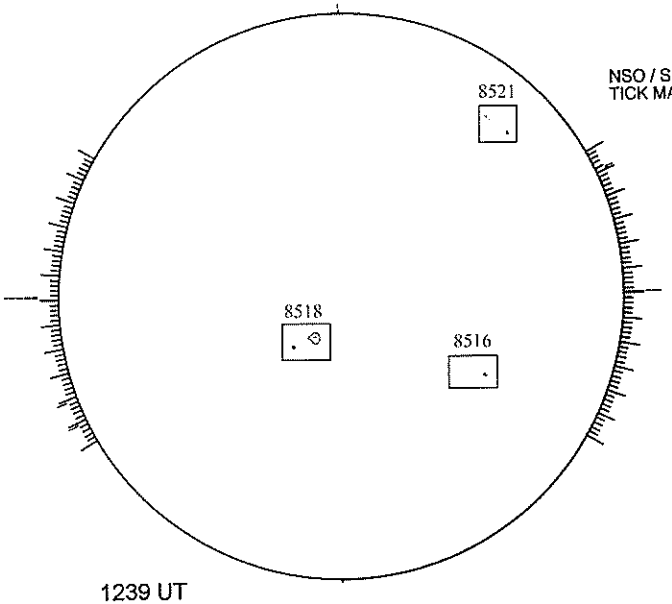


E

0649 UT

S

RAMEY SUNSPOT

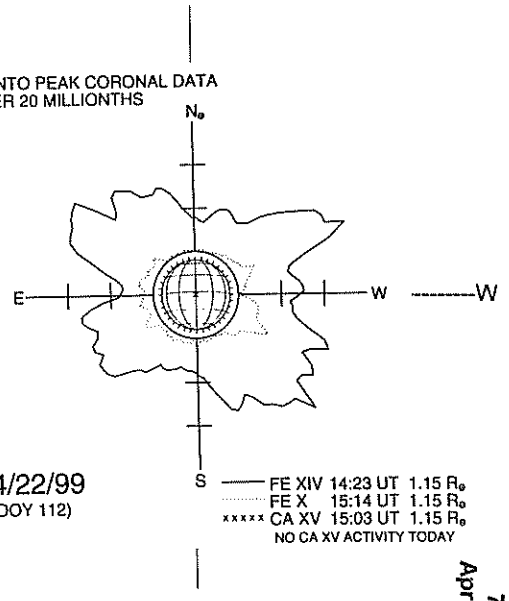



1239 UT

S

SACRAMENTO PEAK CORONA (1.15 Radii)----

NSO / SACRAMENTO PEAK CORONAL DATA
TICK MARKS EVER 20 MILLIONTHS




04/22/99
(DOY 112)

FE XIV 14:23 UT 1.15 $R_\odot$
FE X 15:14 UT 1.15 $R_\odot$
CA XV 15:03 UT 1.15 $R_\odot$
NO CA XV ACTIVITY TODAY

S

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Apr 99

**APRIL 23, 1999 ( P= -25.39, Bo = -4.97, Lo = 109.63)**

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

N

**868.8 nm**

NO DATA

E

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

N

2007 UT

MT. WILSON MAGNETOGRAM

N

DeltaY =
DeltaX =

NO DATA

W

White= +7.5G
Black = -7.5G

SACRAMENTO PEAK H-ALPHA

E

1341 UT

S

RAMEY SUNSPOT

8521

8522

8518

8516

1155 UT

S

SACRAMENTO PEAK CORONA (1.15 Radii)

NSO / SACRAMENTO PEAK CORONAL DATA
TICK MARKS EVER 20 MILLIONTHS

$N_e$

E

W

W

S

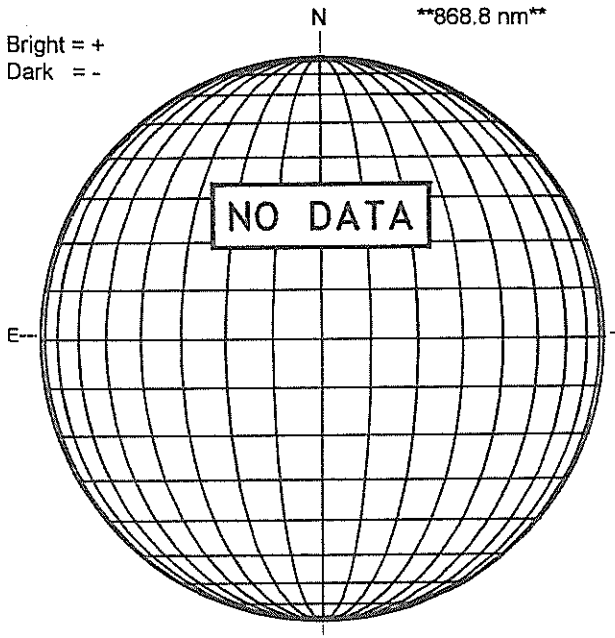
04/23/99
(DOY 113)

FE XIV 14:15 UT 1.15 $R_e$
FE X 15:08 UT 1.15 $R_e$
CA XV 14:57 UT 1.15 $R_e$

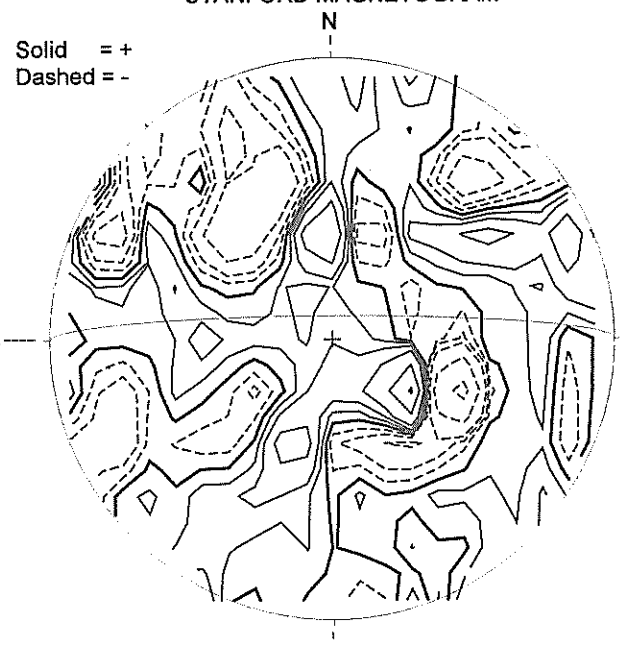
S

**APRIL 24, 1999 ( P= -25.27, Bo = -4.88, Lo = 96.42)**

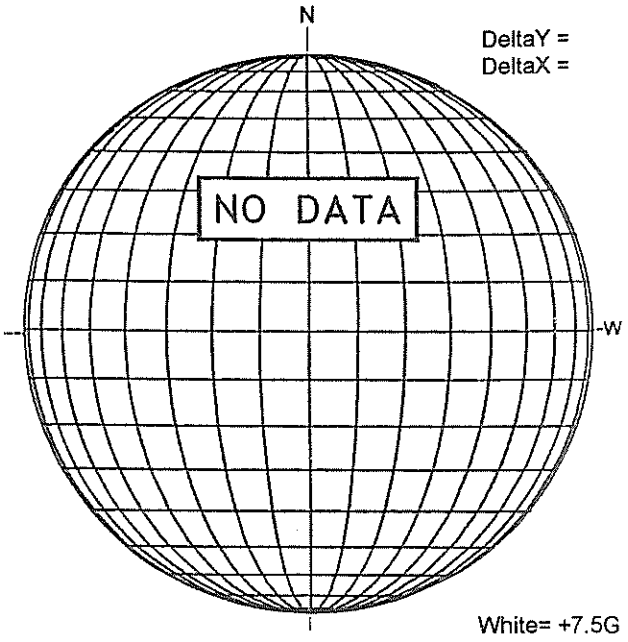
KITT PEAK MAGNETOGRAM



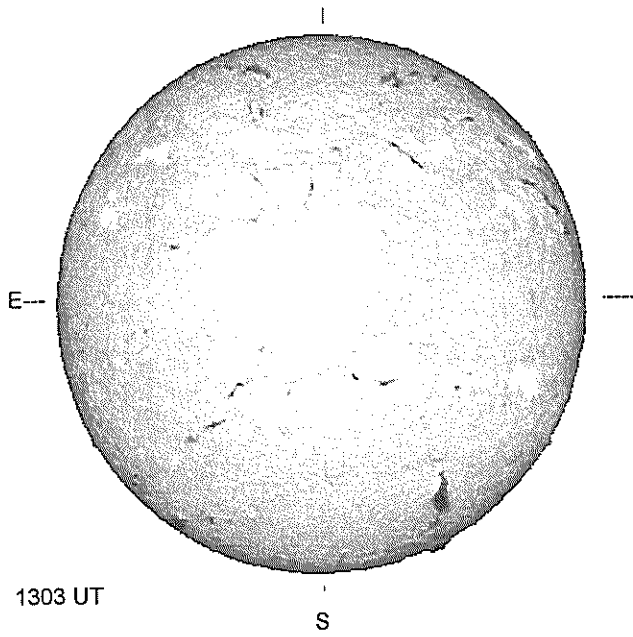

STANFORD MAGNETOGRAM



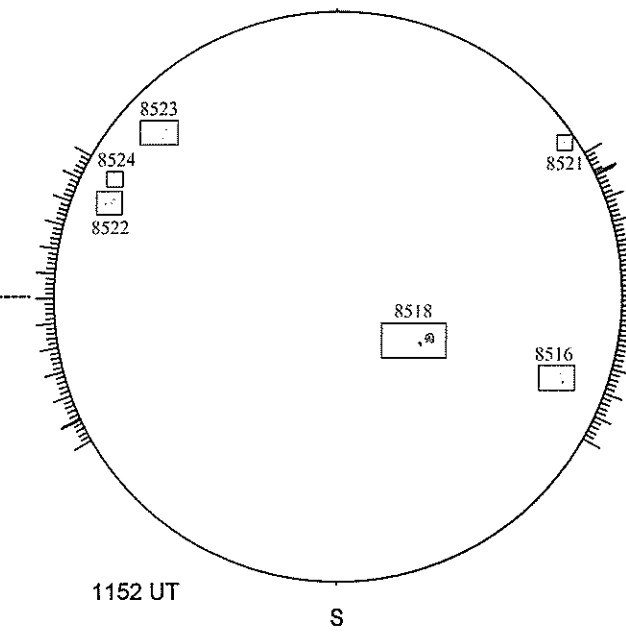

MT. WILSON MAGNETOGRAM



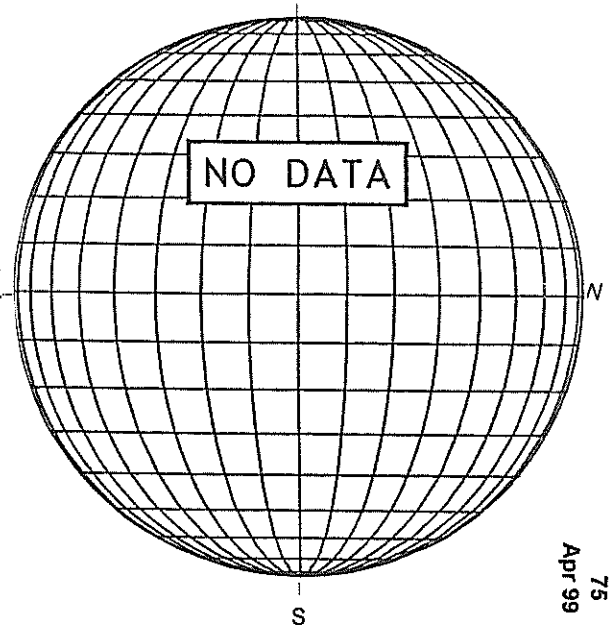

---- MEUDON H-ALPHA




RAMEY SUNSPOT




SACRAMENTO PEAK CORONA (1.15 Radii)----

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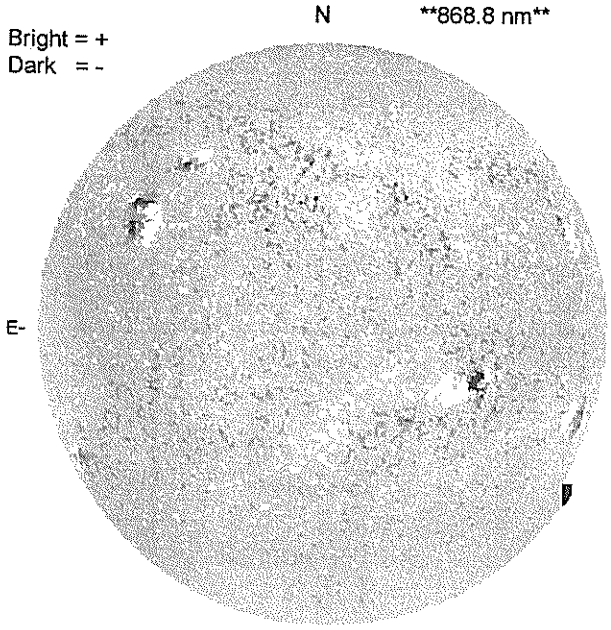
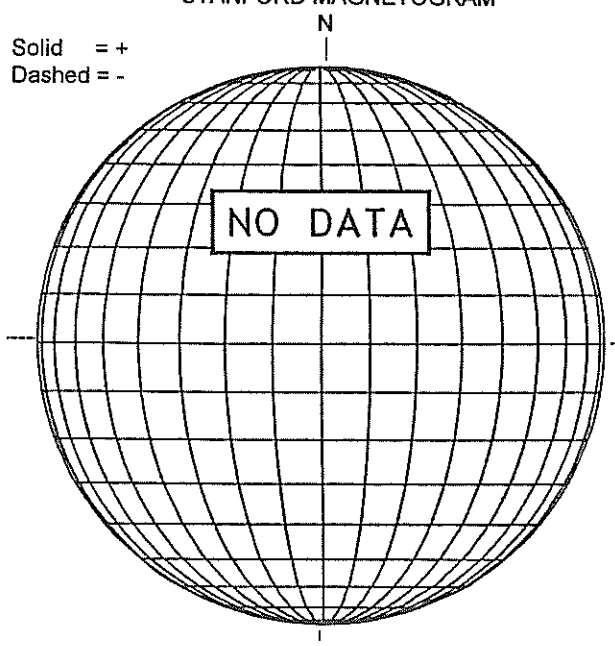
# APRIL 25, 1999 ( P= -25.14, Bo = -4.79, Lo = 83.21)

## KITT PEAK MAGNETOGRAM

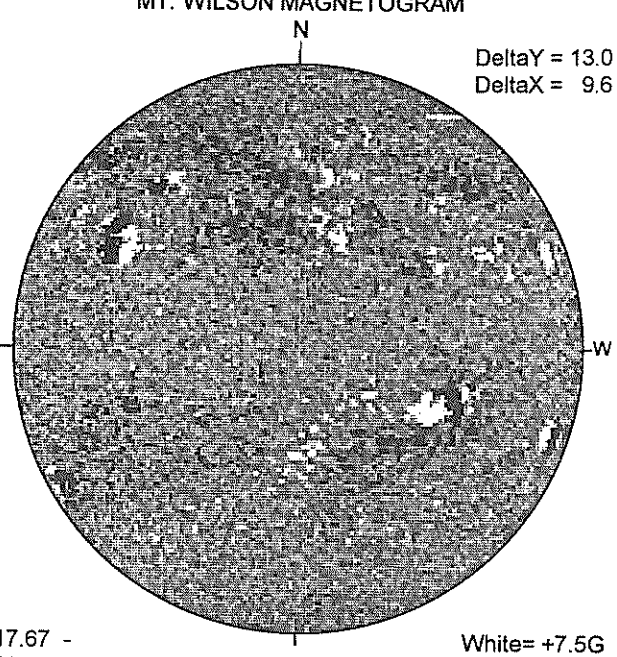



1608 UT

## STANFORD MAGNETOGRAM



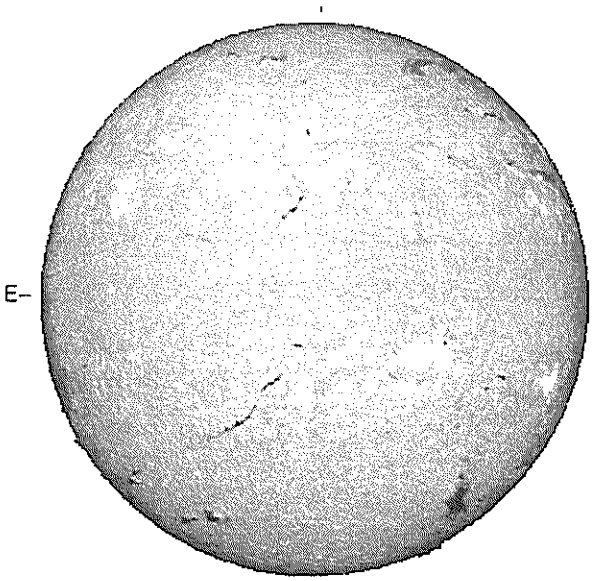

## MT. WILSON MAGNETOGRAM




17.67 -
18.61 UT

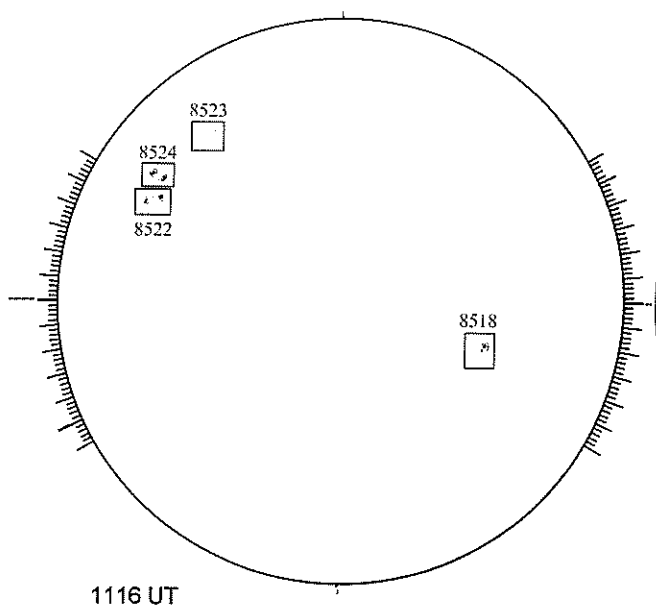
White= +7.5G
Black = -7.5G

## MEUDON H-ALPHA



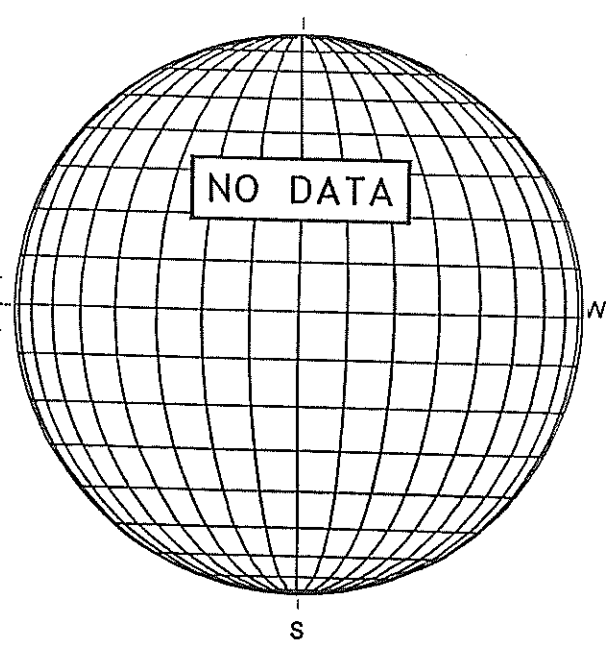

0640 UT

## RAMEY SUNSPOT



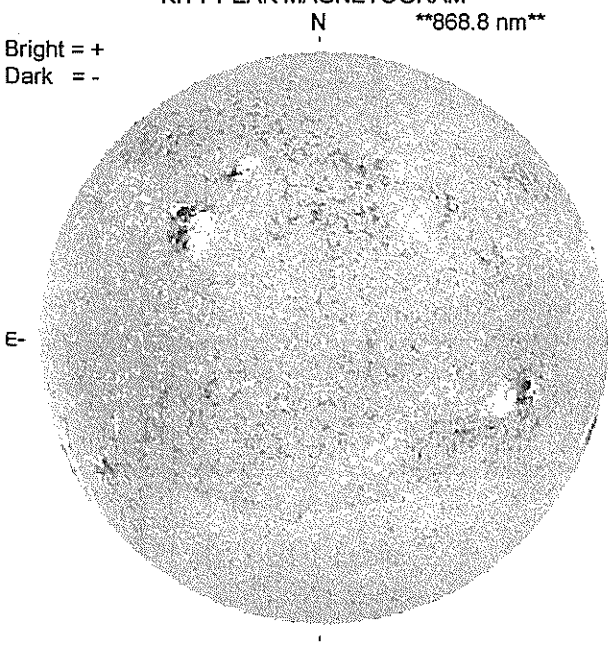

1116 UT

## SACRAMENTO PEAK CORONA (1.15 Radii)



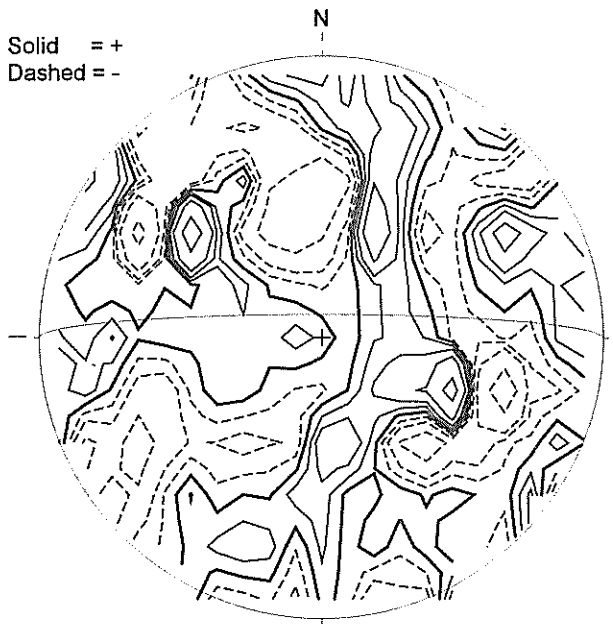
**APRIL 26, 1999 ( P= -25.01, Bo = -4.69, Lo = 69.99)**

KITT PEAK MAGNETOGRAM



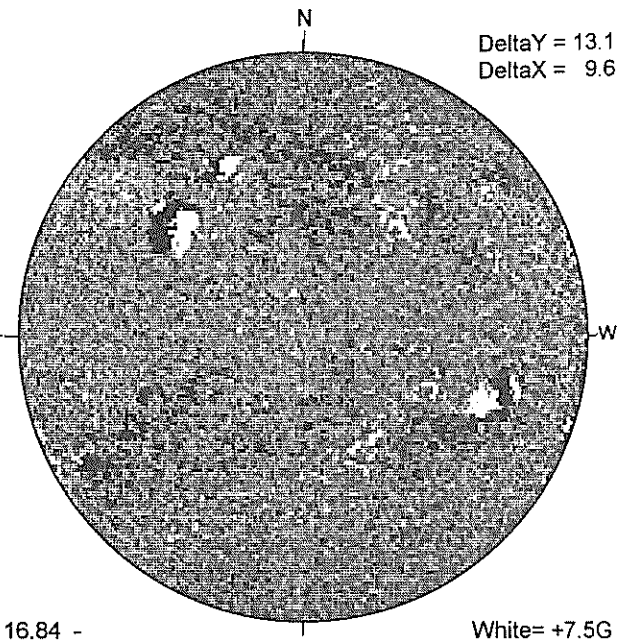

1505 UT

STANFORD MAGNETOGRAM




0002 UT

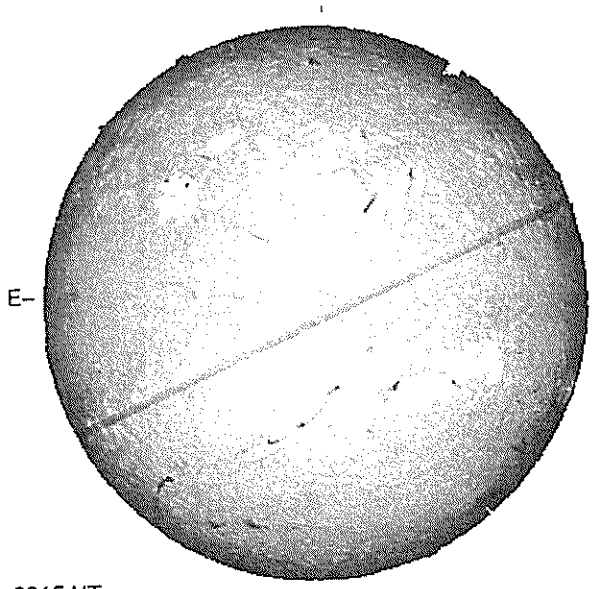
MT. WILSON MAGNETOGRAM




16.84 -
17.77 UT

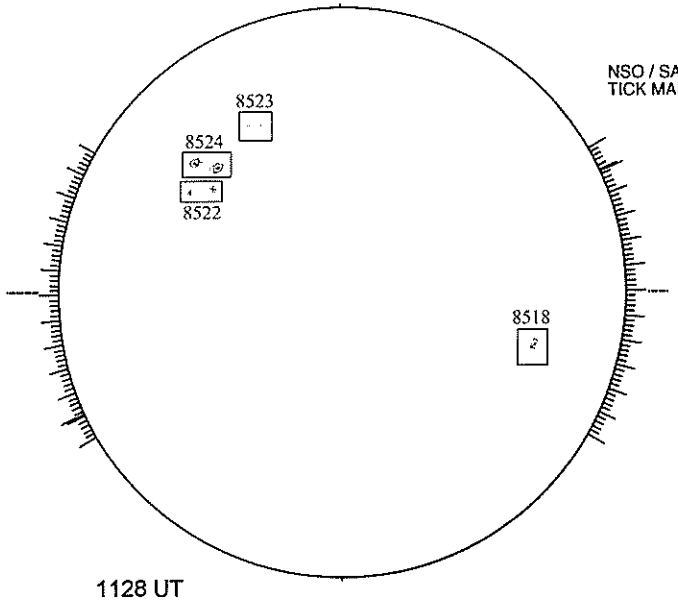
White= +7.5G
Black = -7.5G

MEUDON H-ALPHA



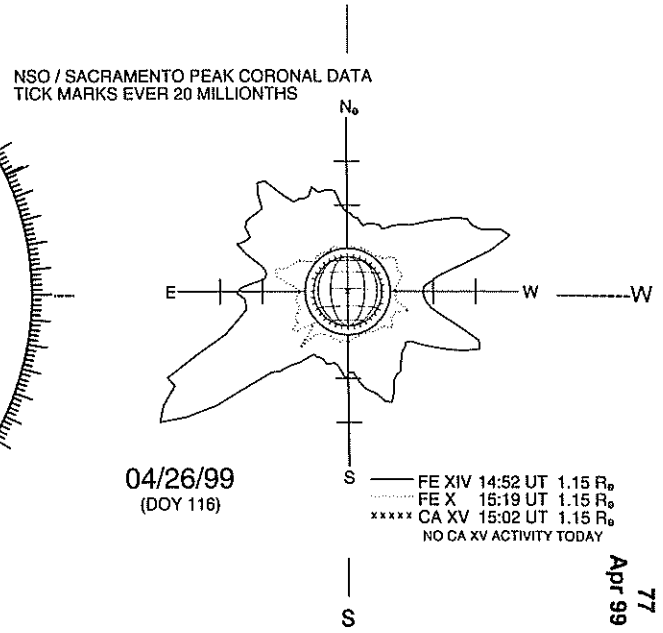

0915 UT

RAMEY SUNSPOT




1128 UT

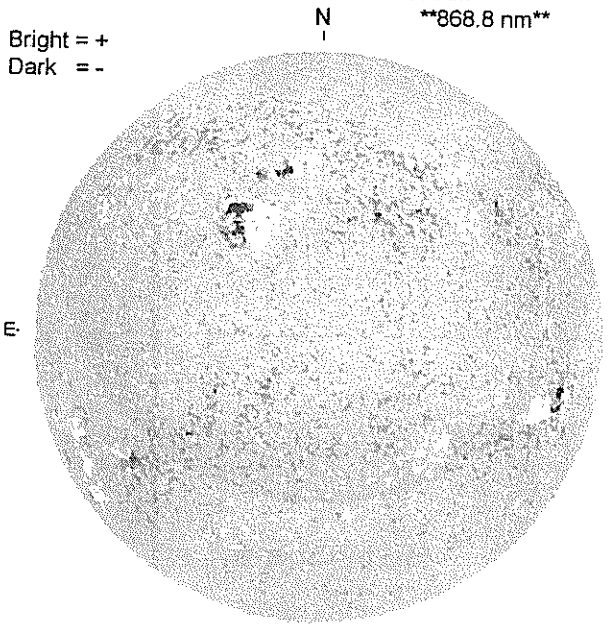
SACRAMENTO PEAK CORONA (1.15 Radii)----




77
Apr 99

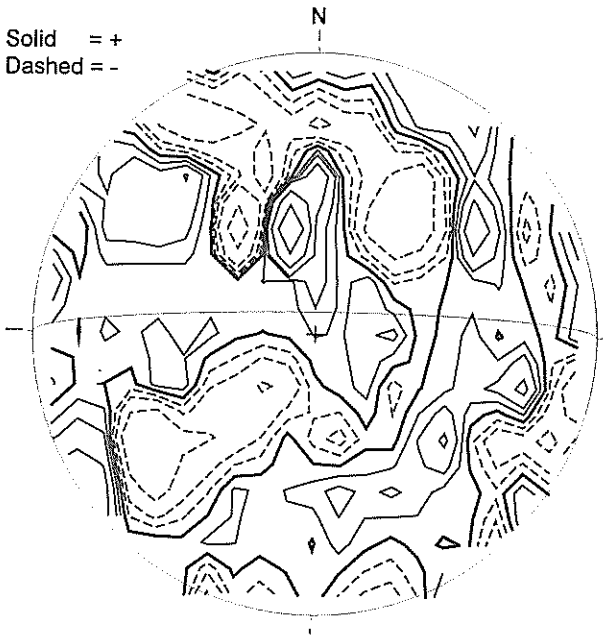
**APRIL 27, 1999 ( P= -24.87, Bo = -4.60, Lo = 56.78)**

KITT PEAK MAGNETOGRAM



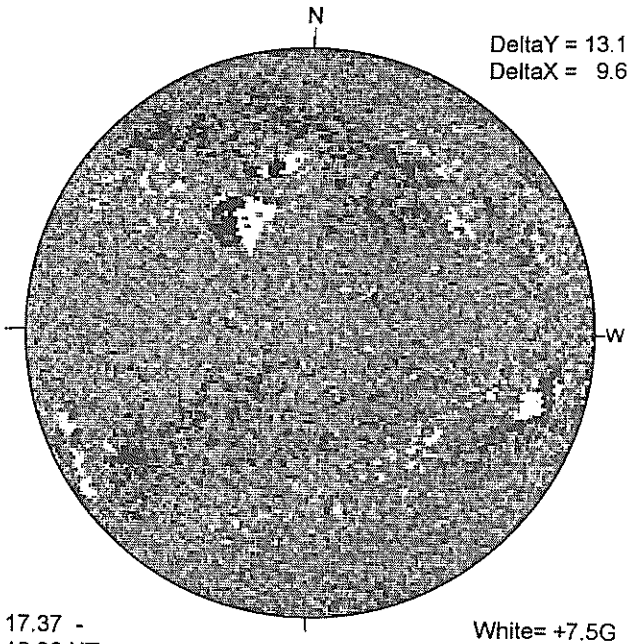

1610 UT

STANFORD MAGNETOGRAM




2247 UT

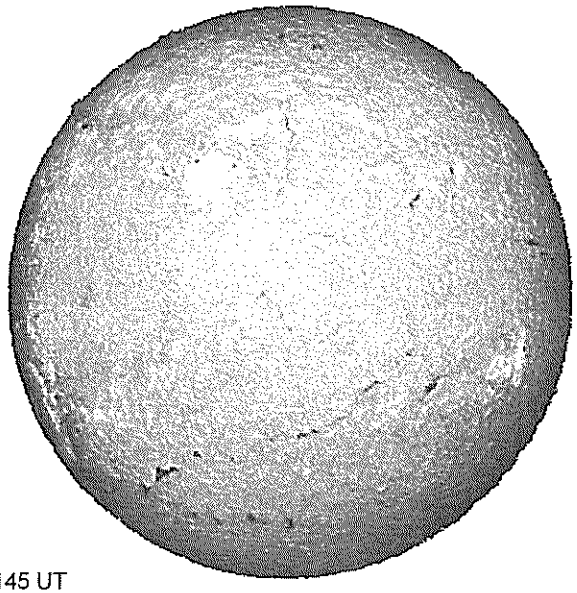
MT. WILSON MAGNETOGRAM




17.37 -
18.30 UT

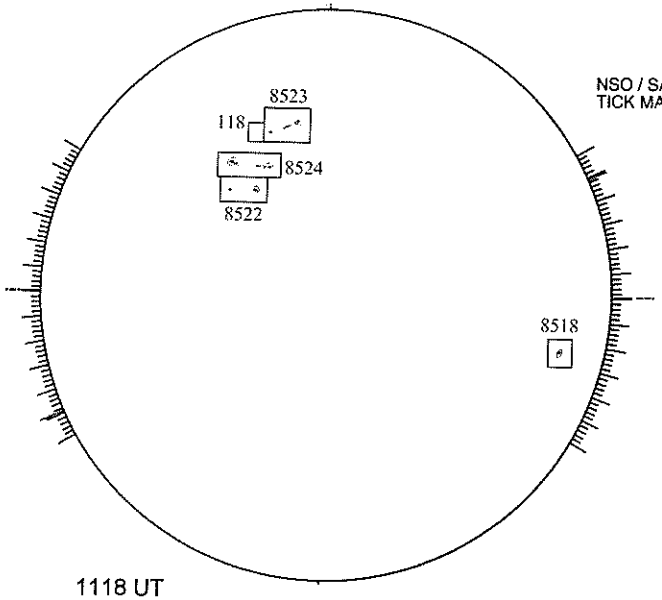
White= +7.5G
Black = -7.5G

MEUDON H-ALPHA



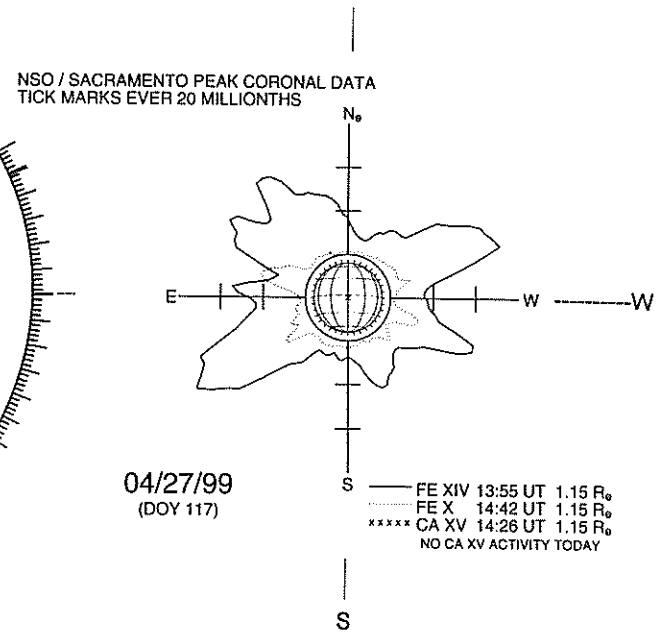

1145 UT

RAMEY SUNSPOT



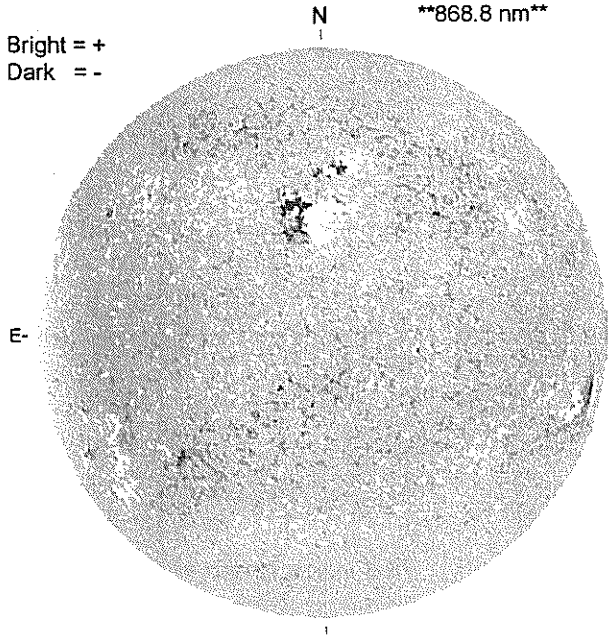

1118 UT

SACRAMENTO PEAK CORONA (1.15 Radii)----



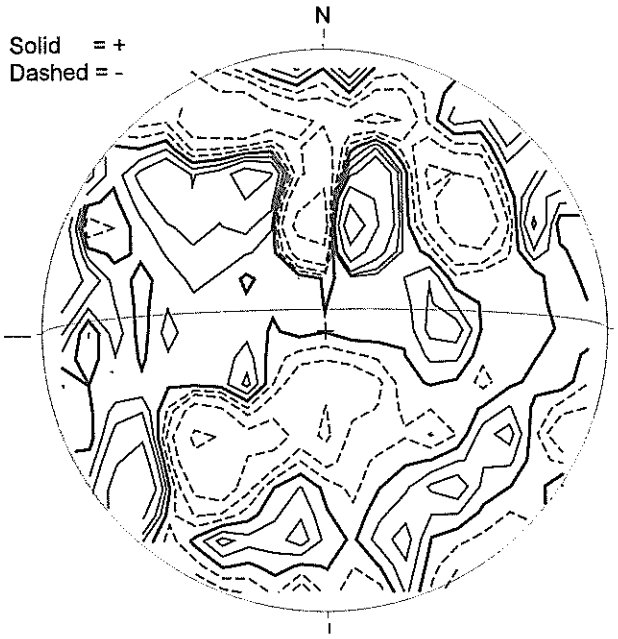
**APRIL 28, 1999 ( P= -24.72, Bo = -4.50, Lo = 43.57)**

KITT PEAK MAGNETOGRAM



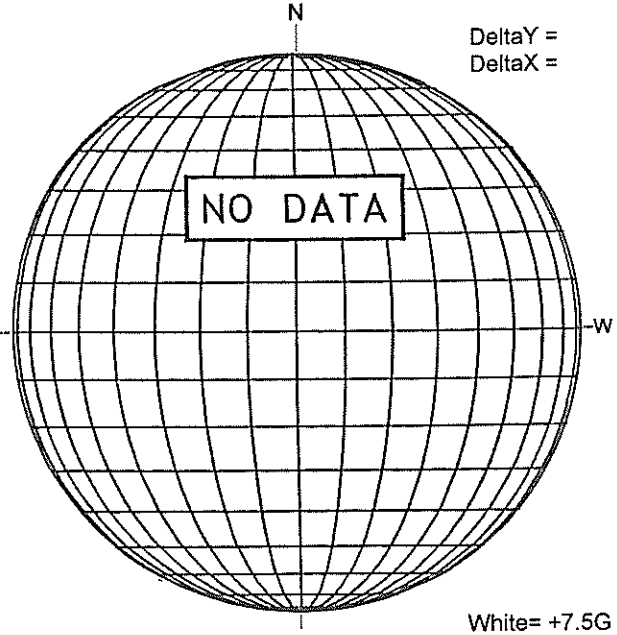

1601 UT

STANFORD MAGNETOGRAM

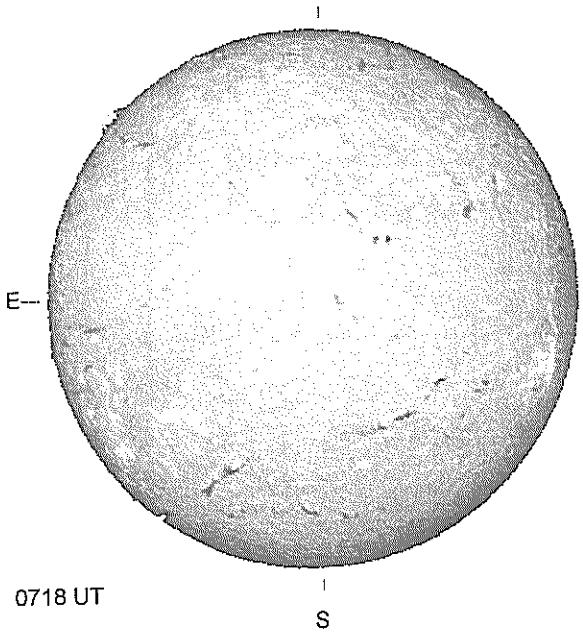



2318 UT

MT. WILSON MAGNETOGRAM

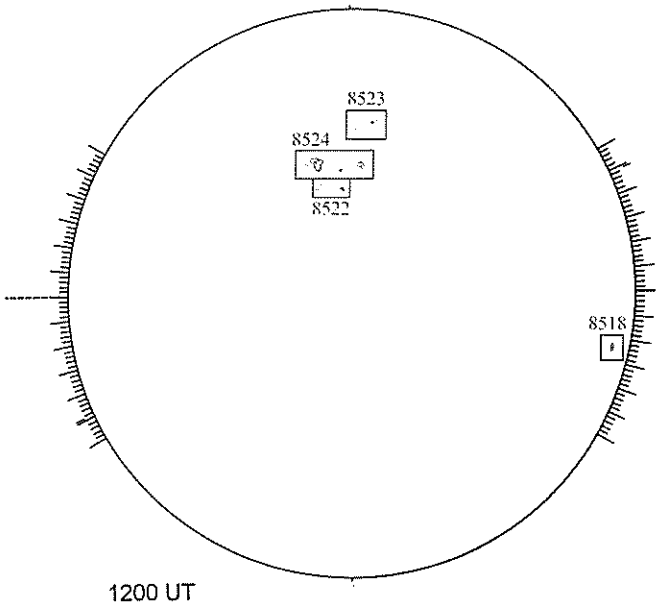



MEUDON H-ALPHA



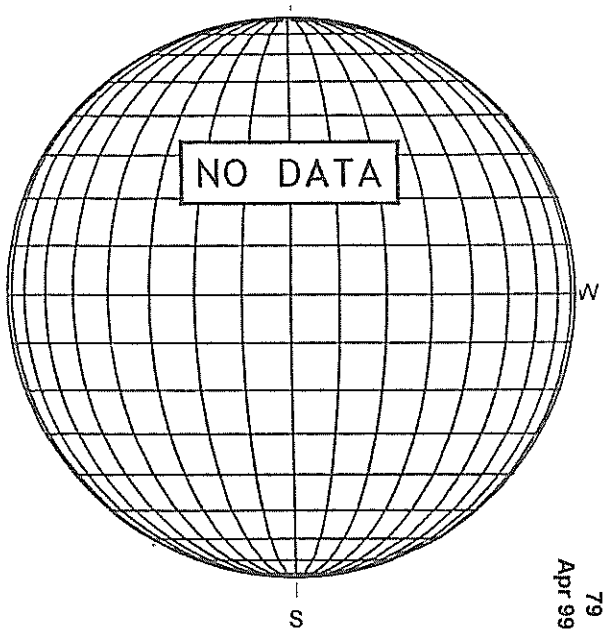

0718 UT

RAMEY SUNSPOT




1200 UT

SACRAMENTO PEAK CORONA (1.15 Radii)----



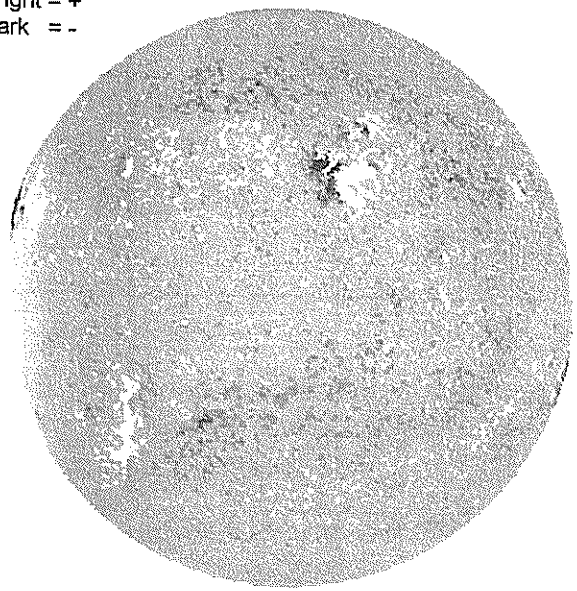
**APRIL 29, 1999 ( P= -24.56, Bo = -4.41, Lo = 30.35)**

KITT PEAK MAGNETOGRAM

N

**868.8 nm**

Bright = +
Dark = -




1815 UT

STANFORD MAGNETOGRAM

N

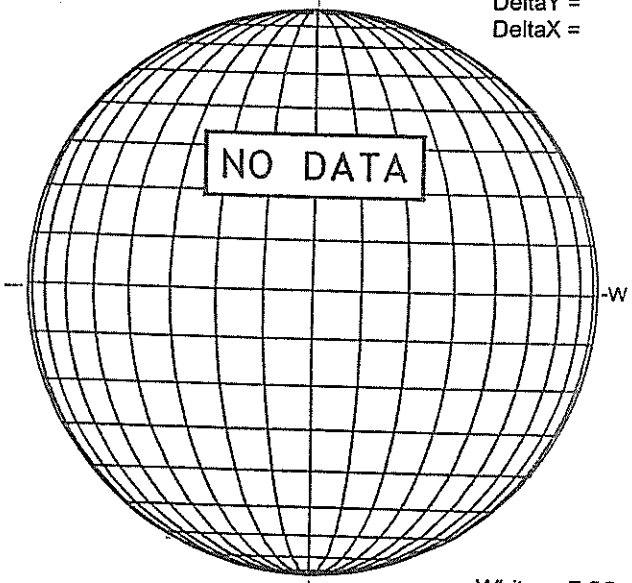
Solid = +
Dashed = -

2232 UT

MT. WILSON MAGNETOGRAM

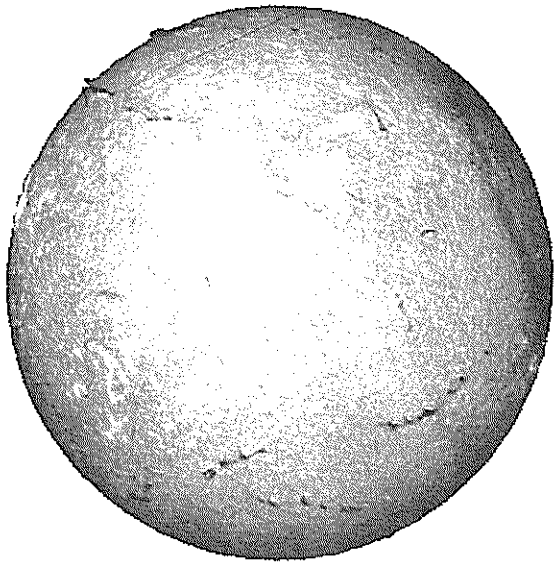
N

DeltaY =
DeltaX =



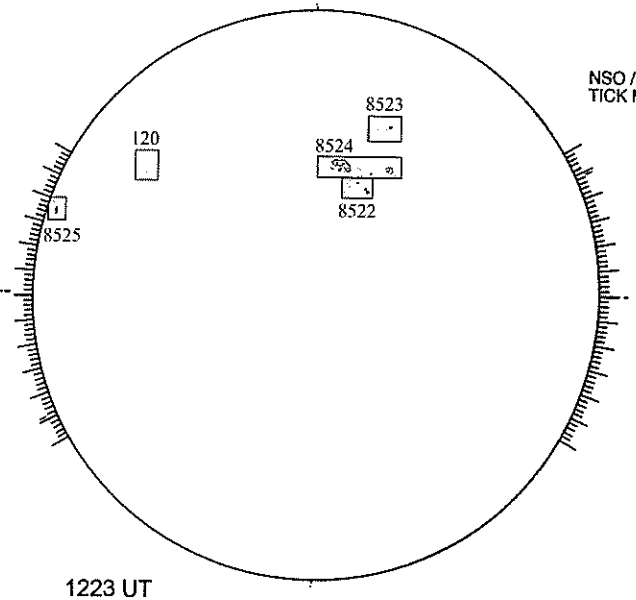

White= +7.5G
Black = -7.5G

MEUDON H-ALPHA




1244 UT

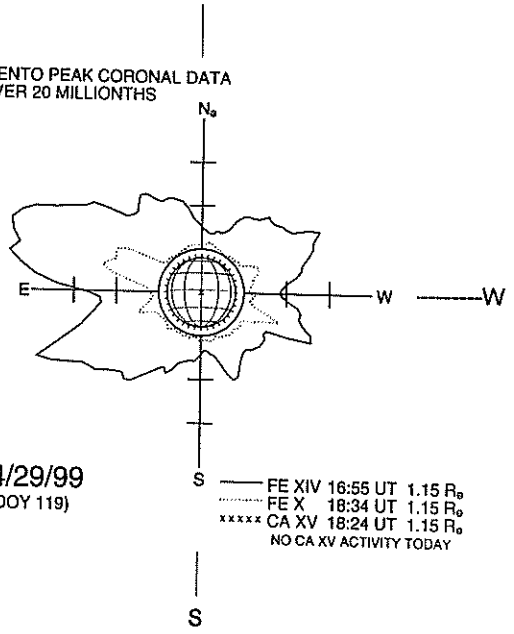
RAMEY SUNSPOT




1223 UT

SACRAMENTO PEAK CORONA (1.15 Radii)

NSO / SACRAMENTO PEAK CORONAL DATA
TICK MARKS EVER 20 MILLIONTHS

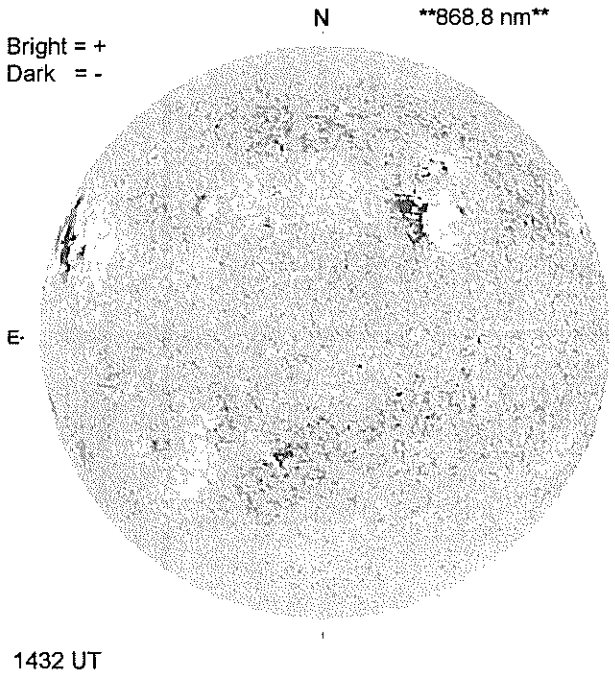



04/29/99
(DOY 119)

FE XIV 16:55 UT 1.15 $R_\odot$
FE X 18:34 UT 1.15 $R_\odot$
xxxxx CA XV 18:24 UT 1.15 $R_\odot$
NO CA XV ACTIVITY TODAY

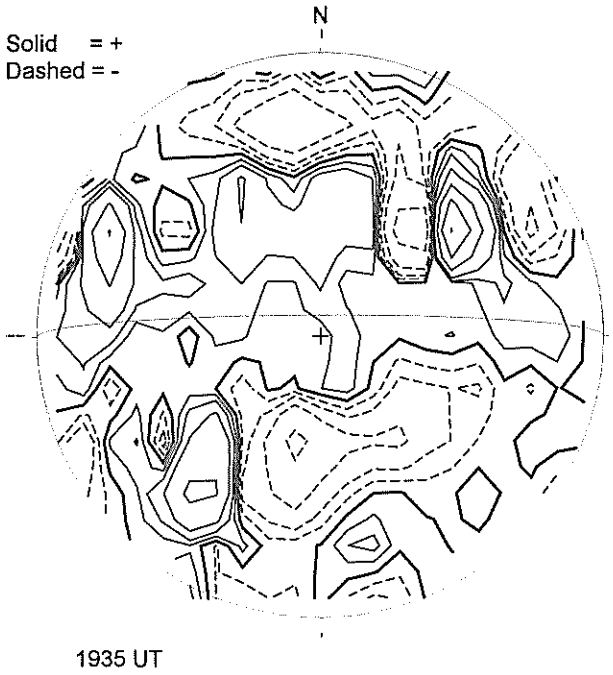
**APRIL 30, 1999 ( P= -24.40, Bo = -4.31, Lo = 17.14)**

KITT PEAK MAGNETOGRAM



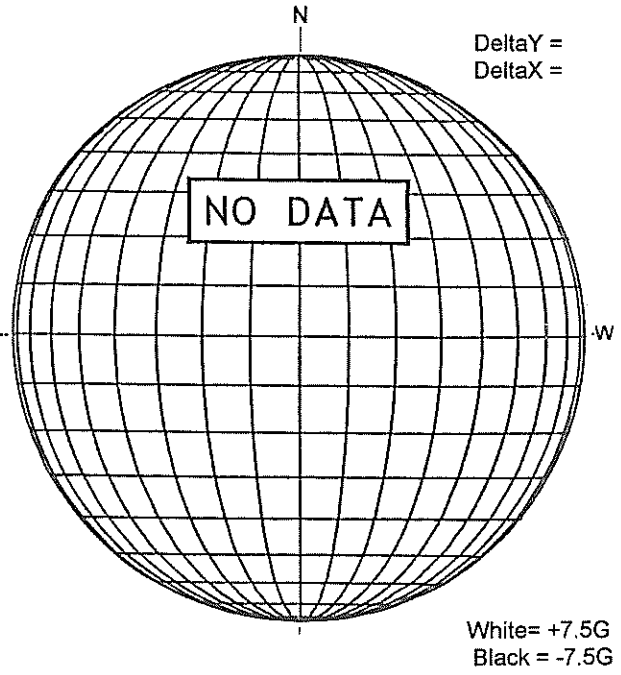

1432 UT

STANFORD MAGNETOGRAM

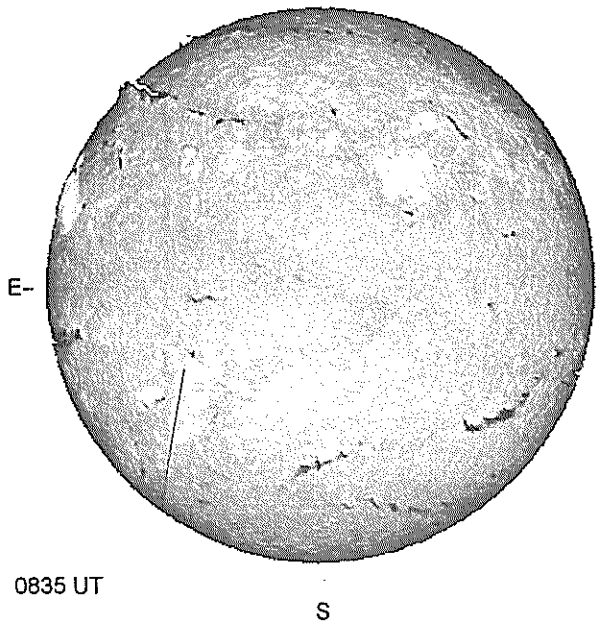



1935 UT

MT. WILSON MAGNETOGRAM

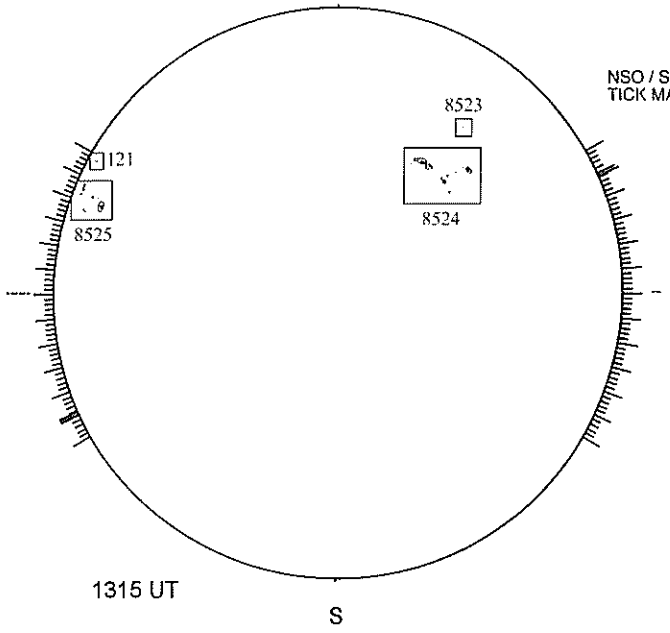



MEUDON H-ALPHA



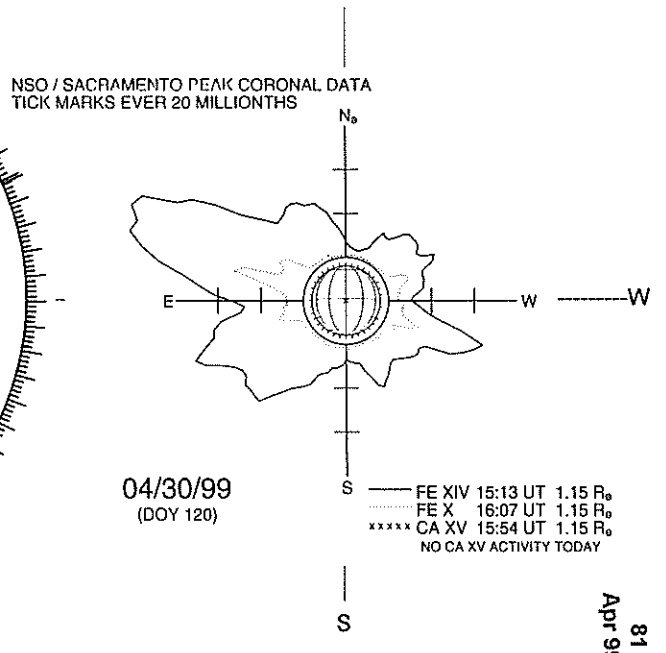

0835 UT

RAMEY SUNSPOT



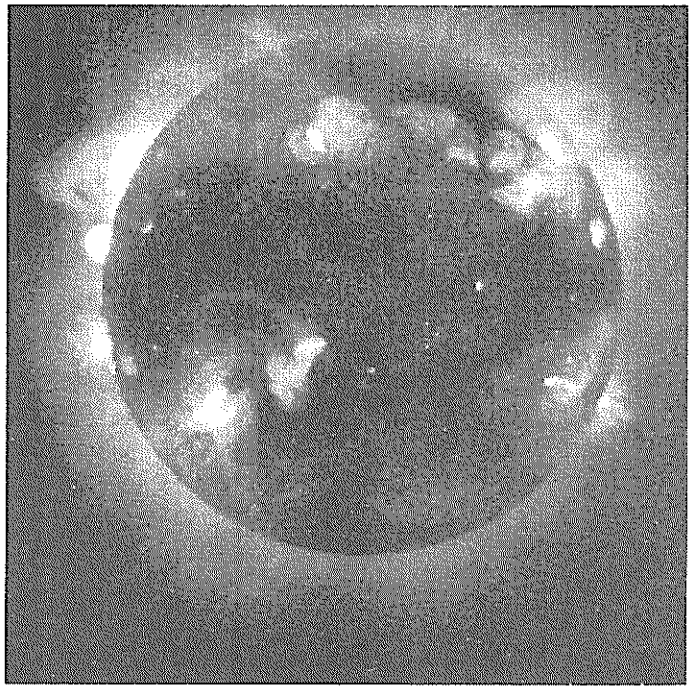

1315 UT

SACRAMENTO PEAK CORONA (1.15 Radii)----

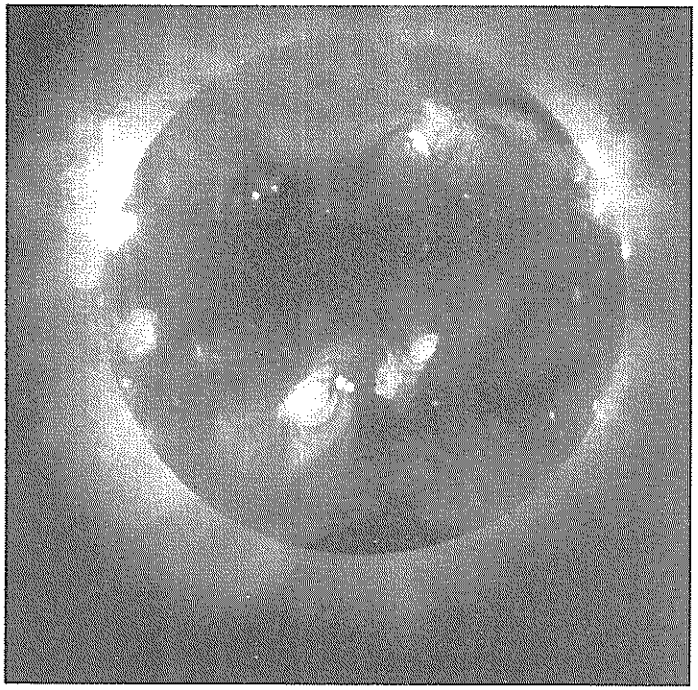


# YOHKOH SOFT X-RAY TELESCOPE IMAGES

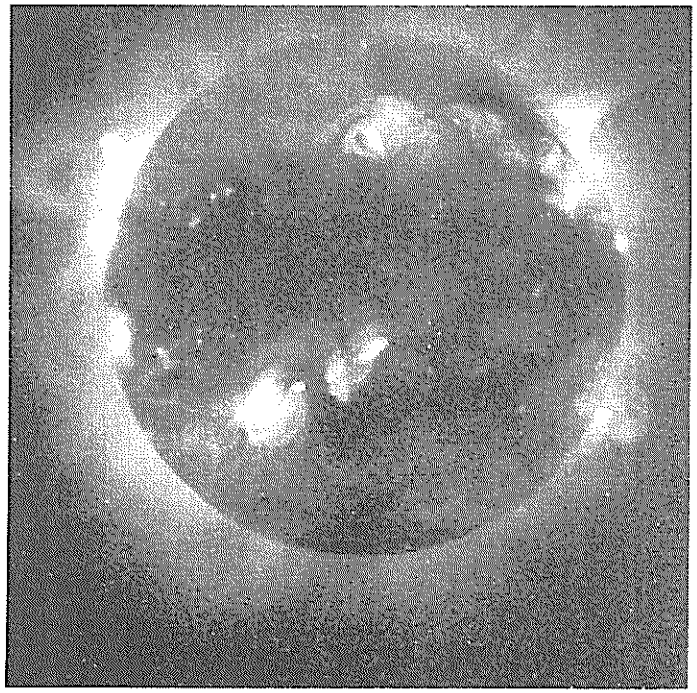
April
1999



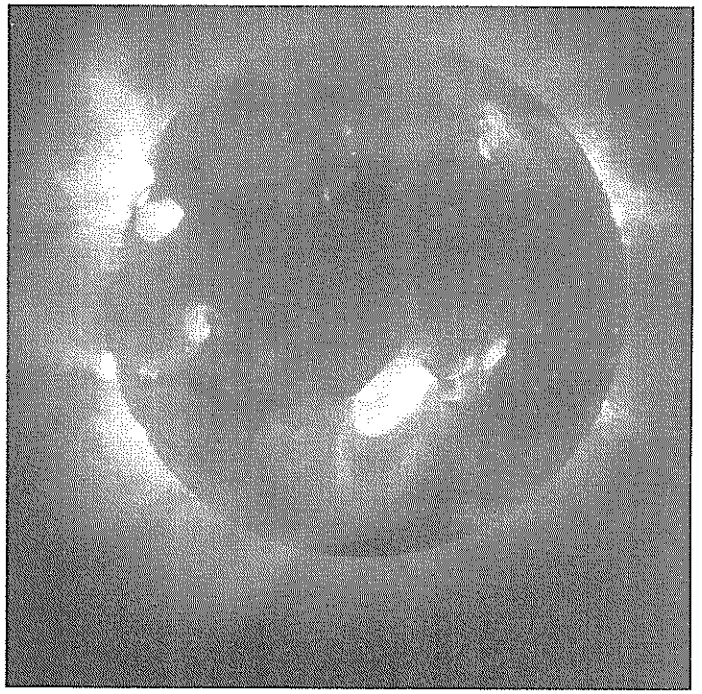
Day 1
11:55:31 UT



Day 3
11:59:40 UT



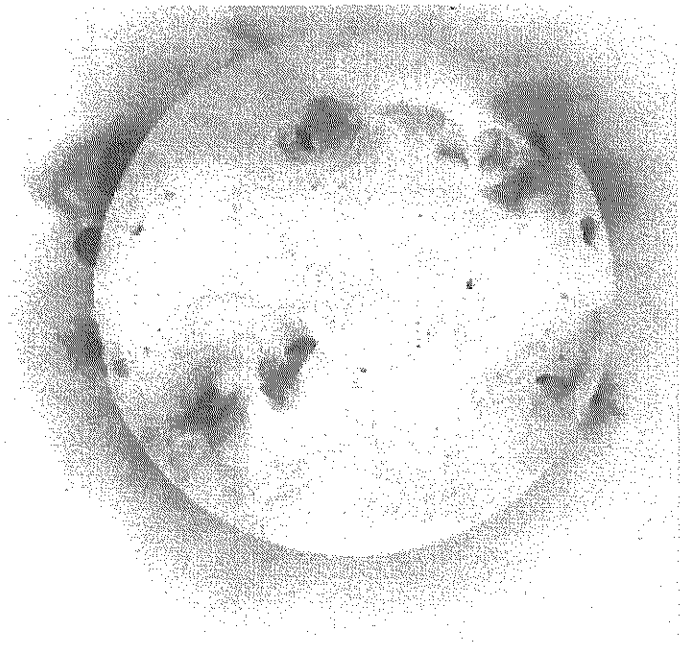
Day 2
13:26:58 UT



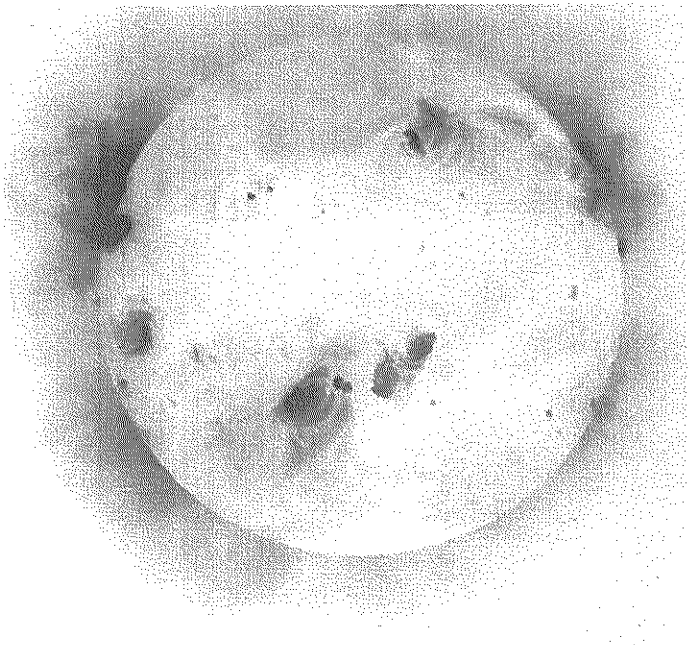
Day 4
18:41:40 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

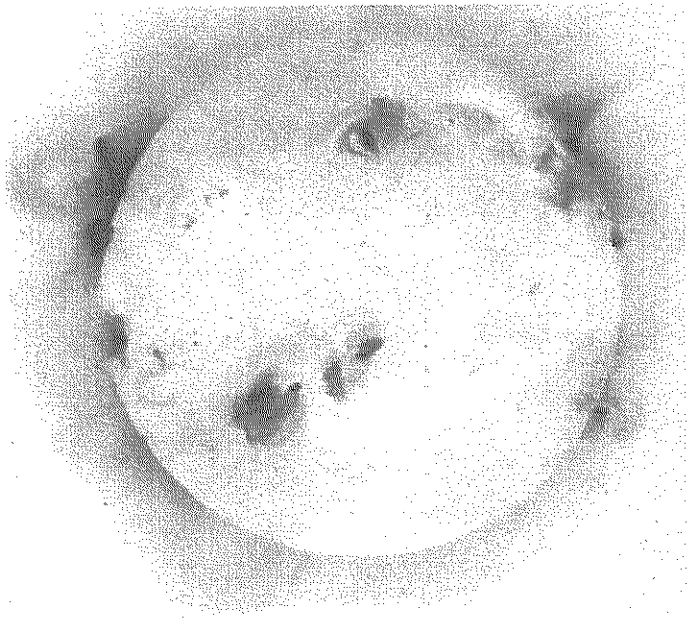
April
1999



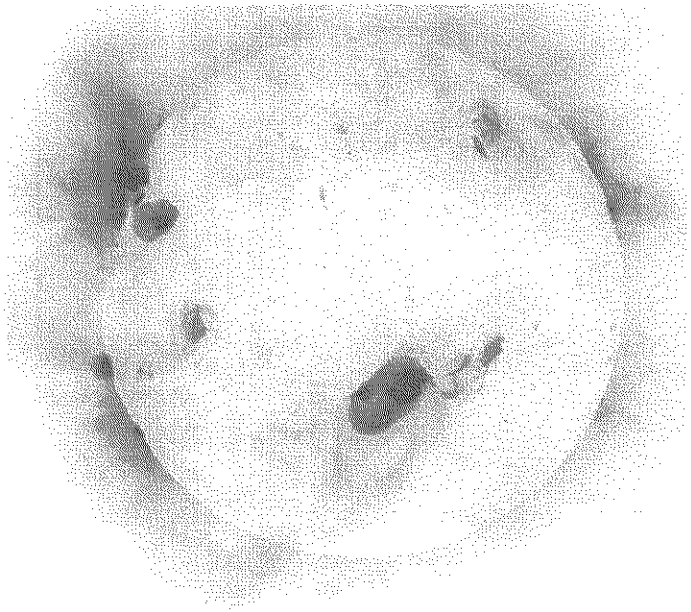
Day 1
11:55:31 UT



Day 3
11:59:40 UT



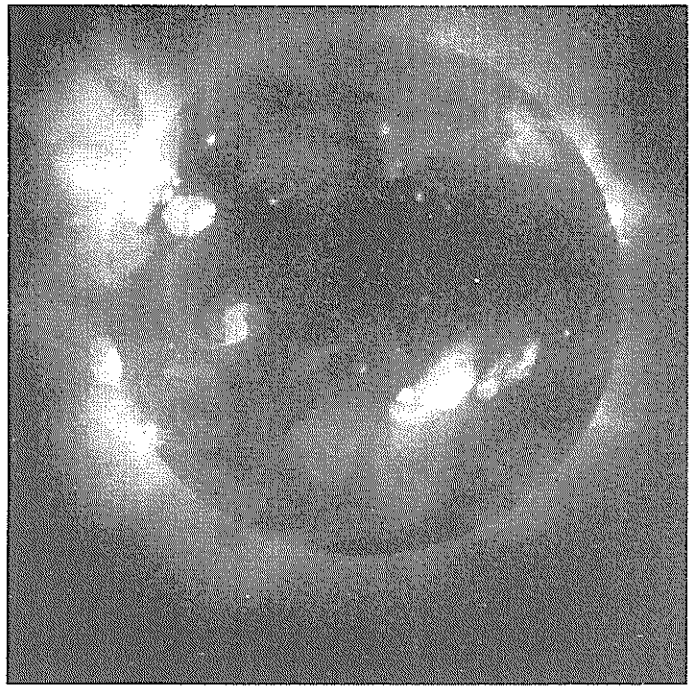
Day 2
13:26:58 UT



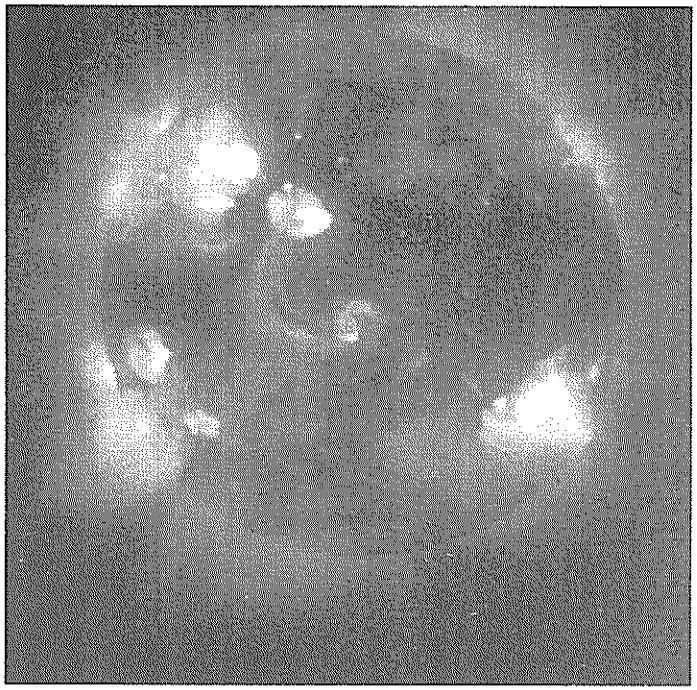
Day 4
18:41:40 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

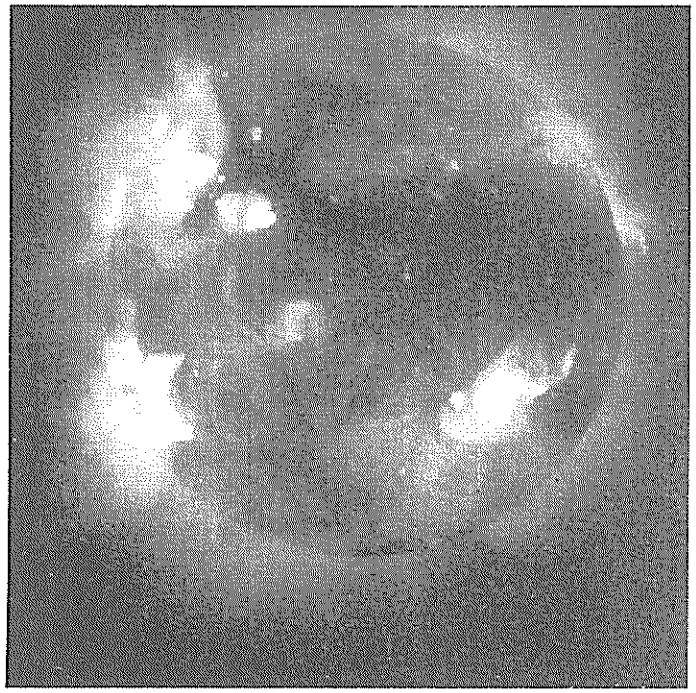
April
1999



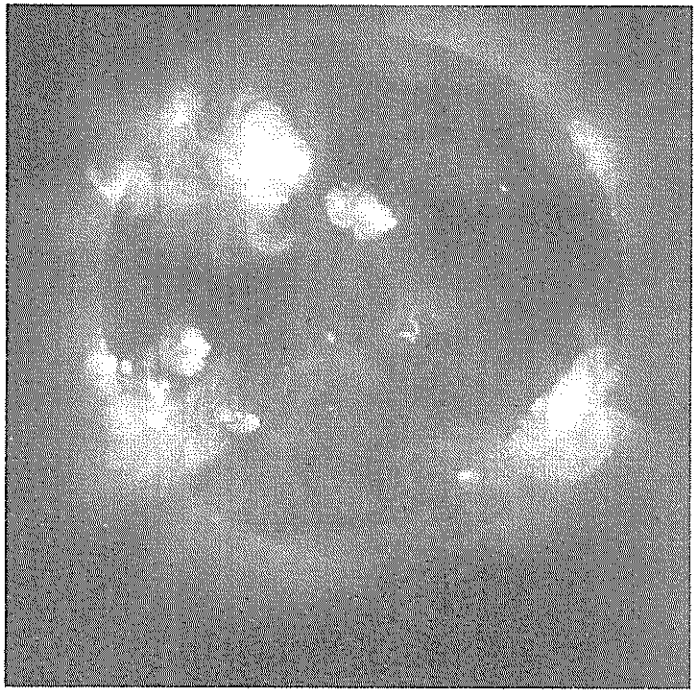
Day 5
12:37:54 UT



Day 7
11:51:13 UT



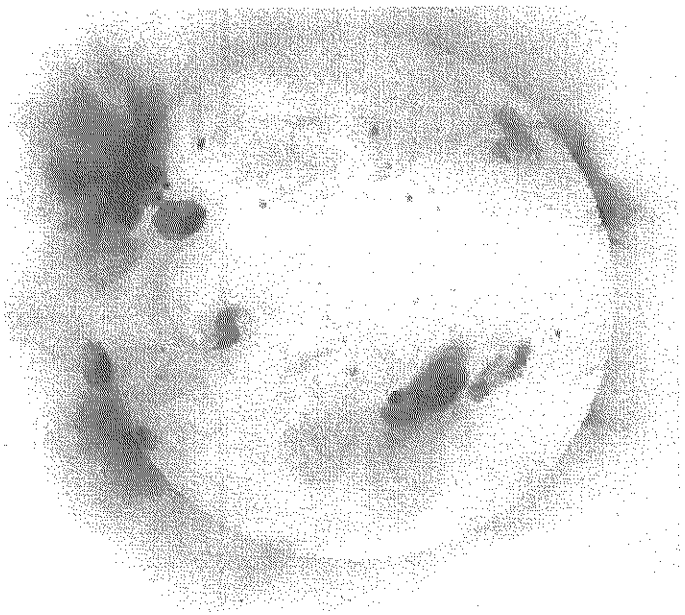
Day 6
12:52:33 UT



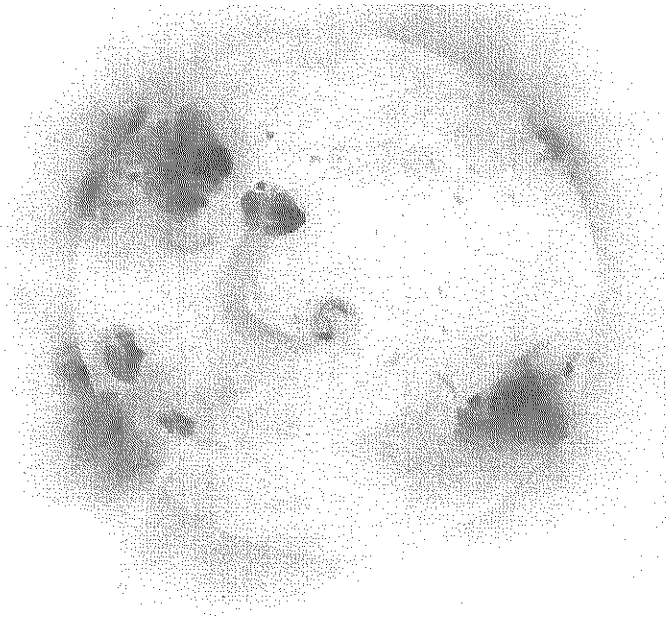
Day 8
11:33:53 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

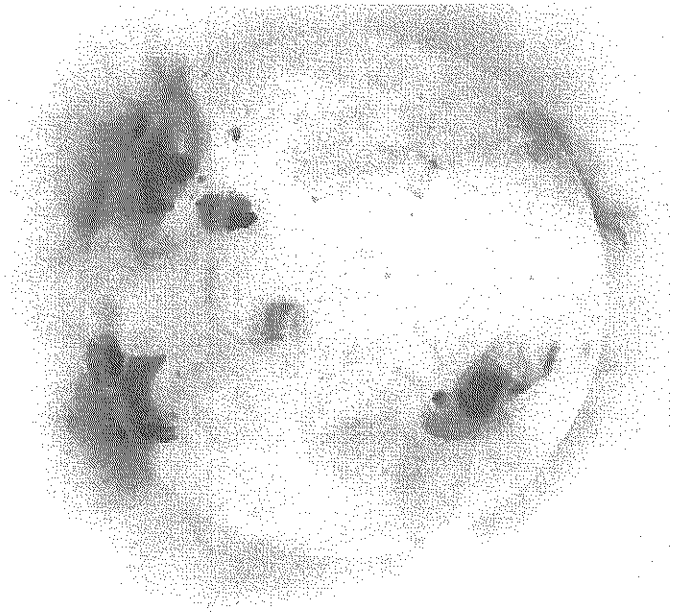
April
1999



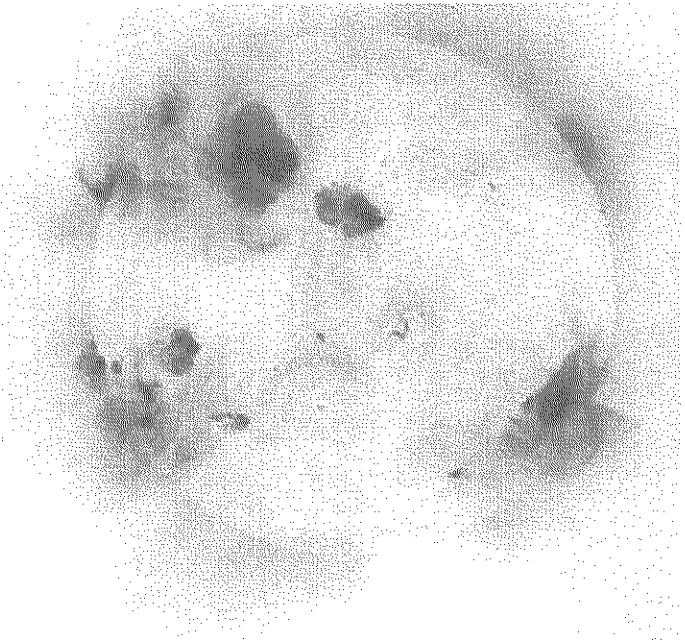
Day 5
12:37:54 UT



Day 7
11:51:13 UT



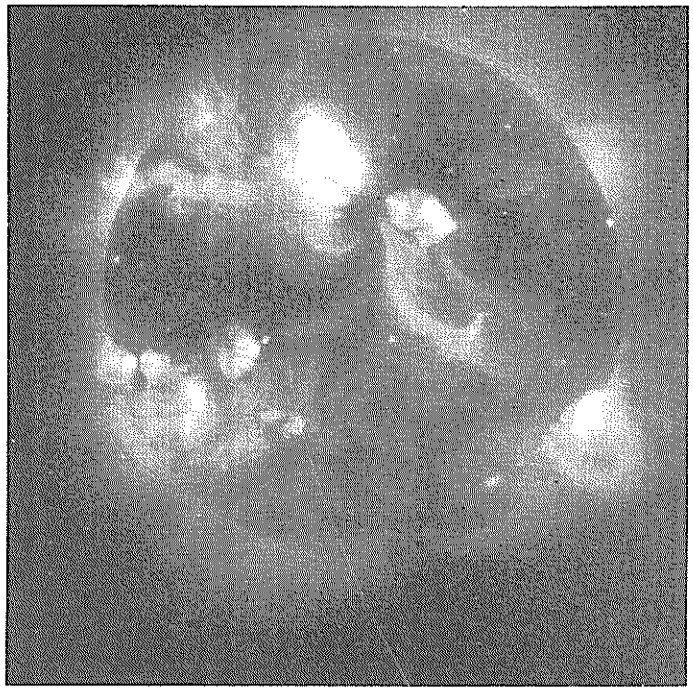
Day 6
12:52:33 UT



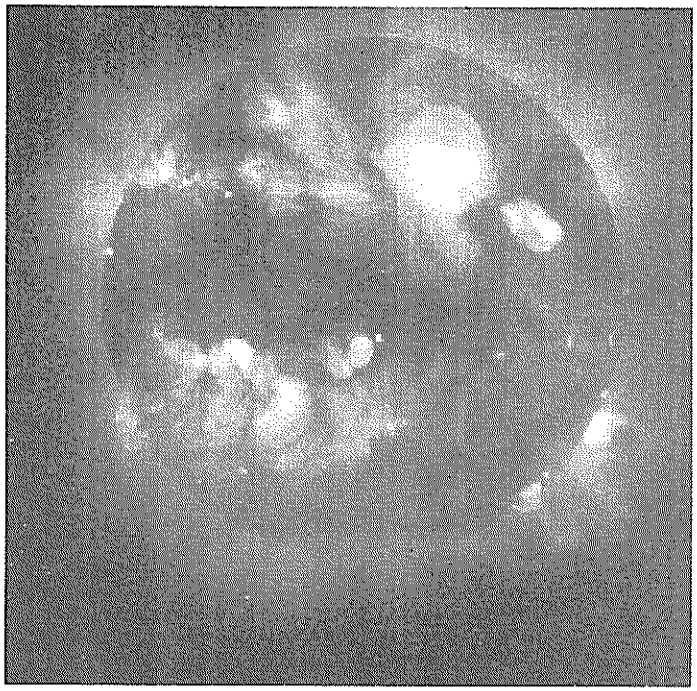
Day 8
11:33:53 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

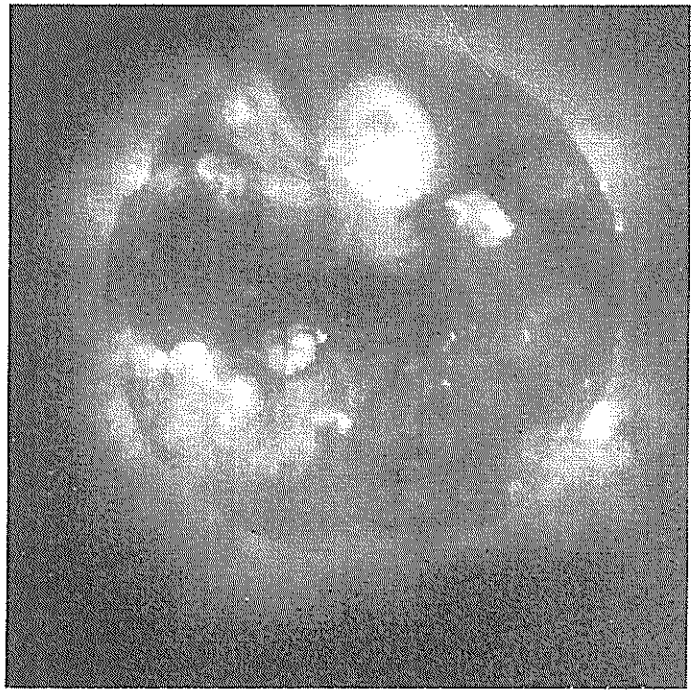
April
1999



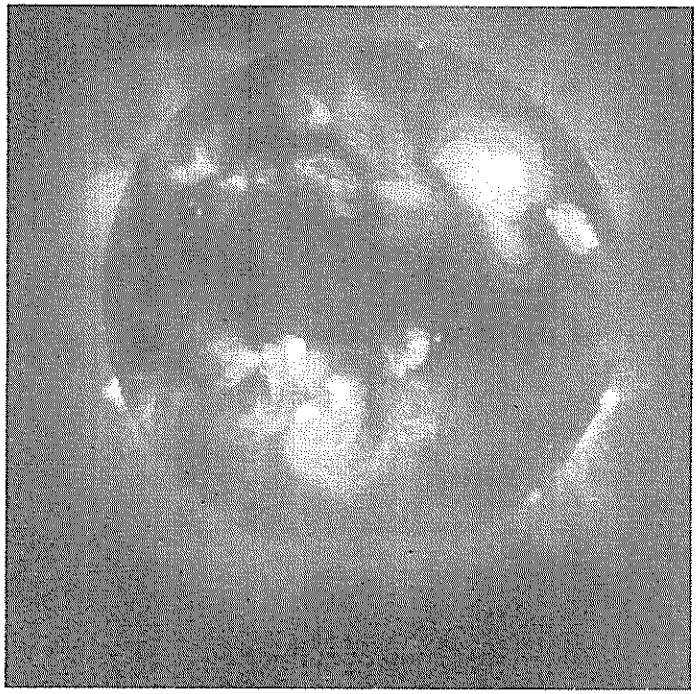
Day 9
11:58:41 UT



Day 11
12:27:28 UT



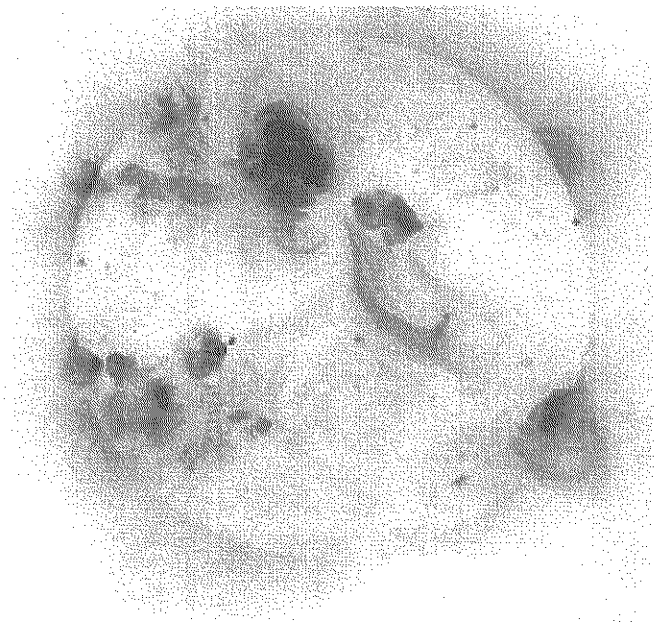
Day 10
12:24:17 UT



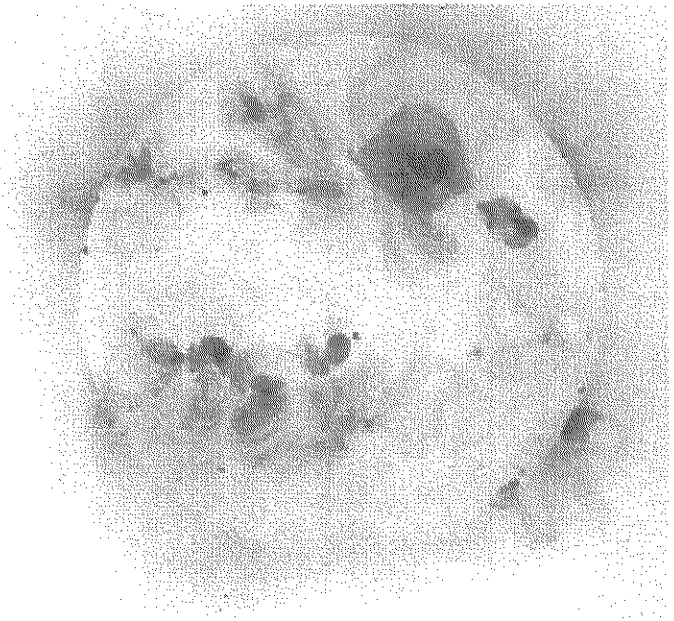
Day 12
12:27:28 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

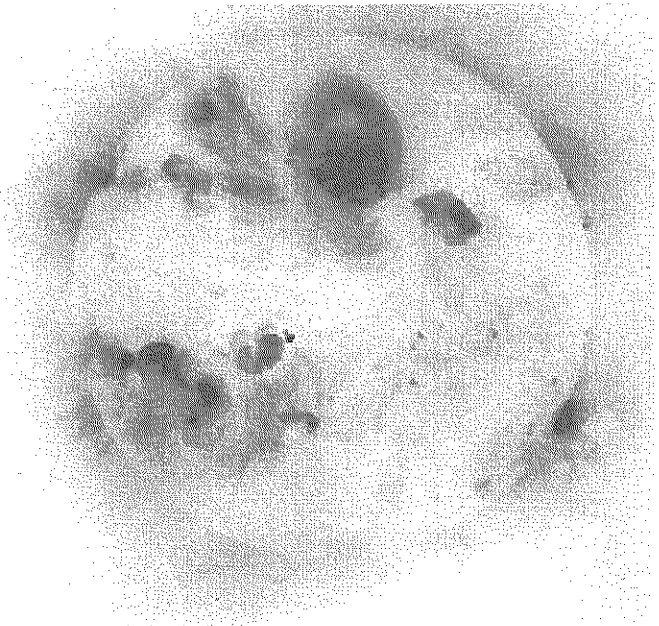
April
1999



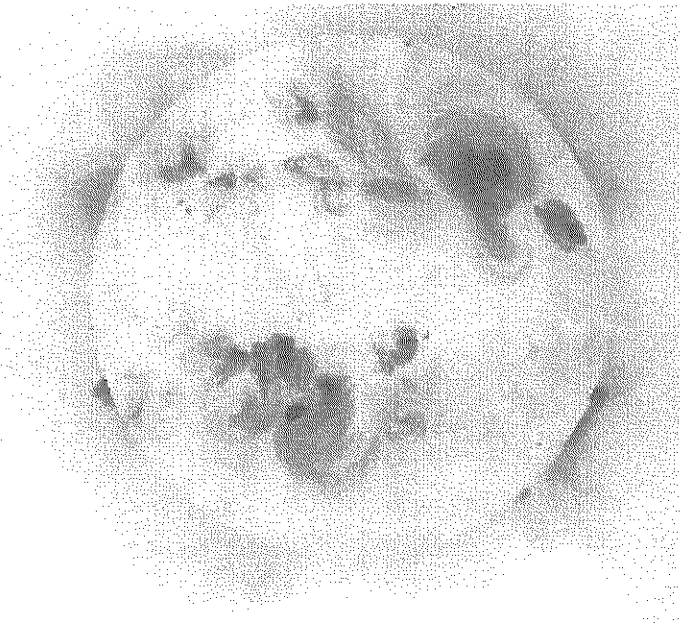
Day 9
11:58:41 UT



Day 11
12:27:28 UT



Day 10
12:24:17 UT



Day 12
12:27:28 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

April
1999



Day 13
11:53:10 UT



Day 14
12:02:20 UT



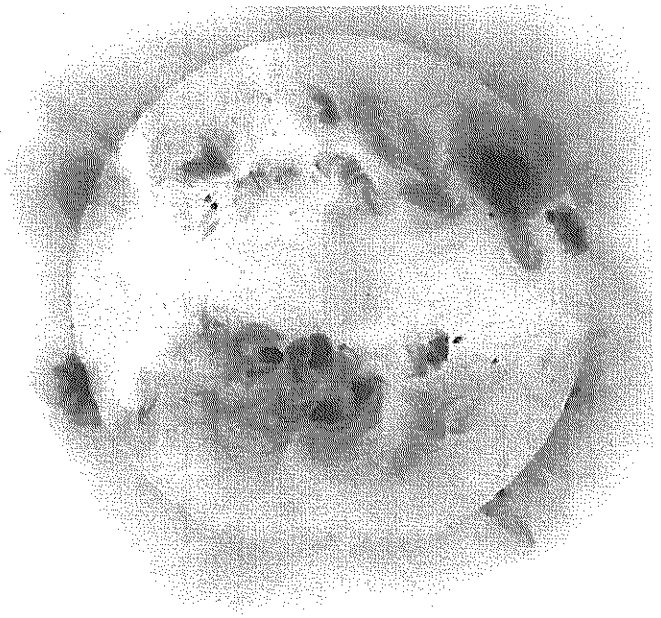
Day 15



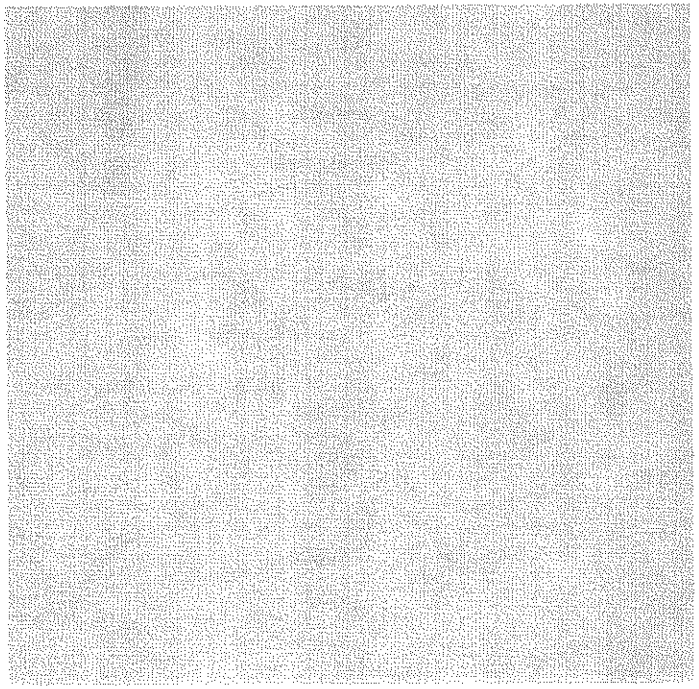
Day 16
12:02:07 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

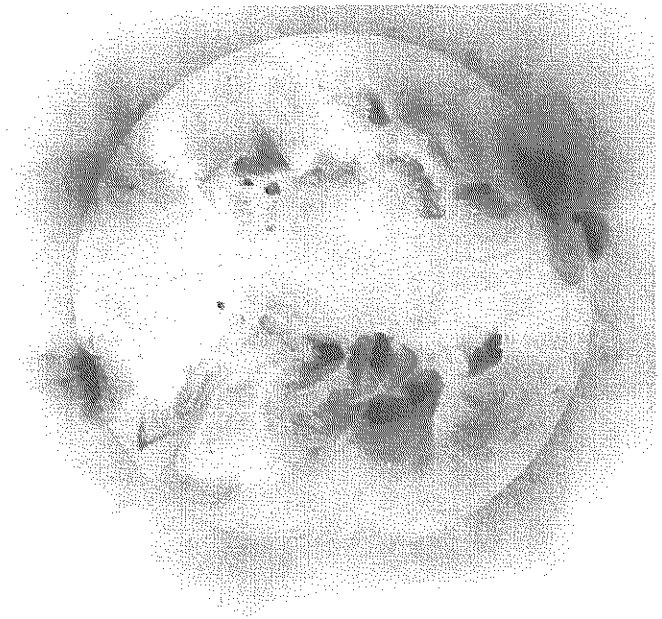
April
1999



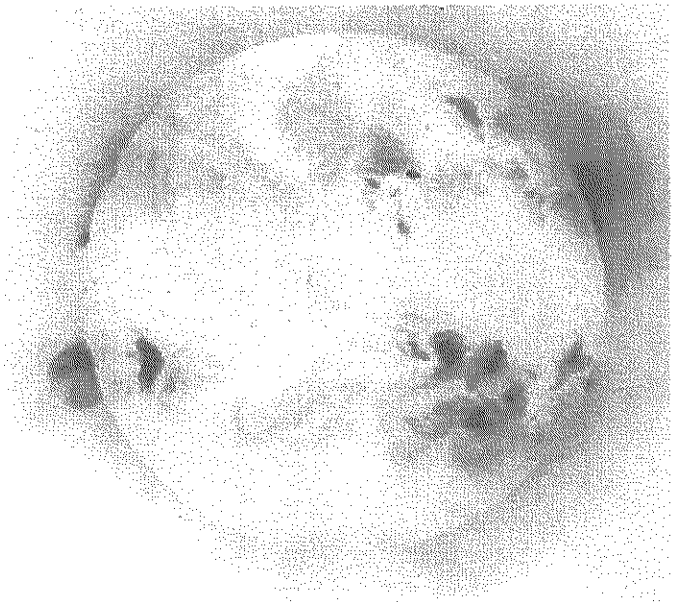
Day 13
11:53:10 UT



Day 15



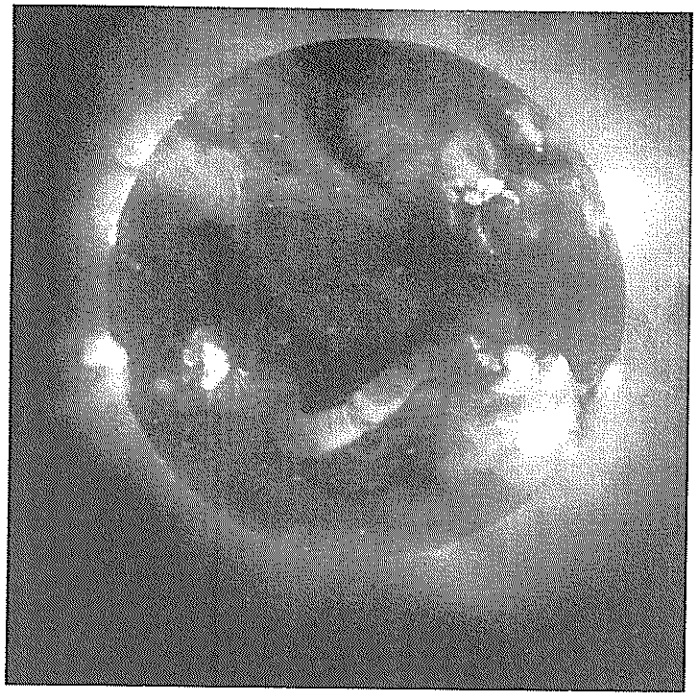
Day 14
12:02:20 UT



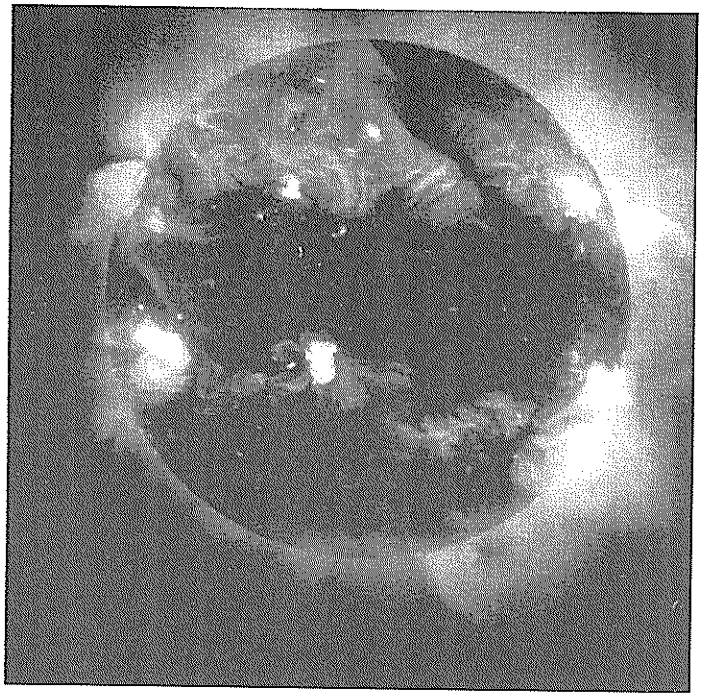
Day 16
12:02:07 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

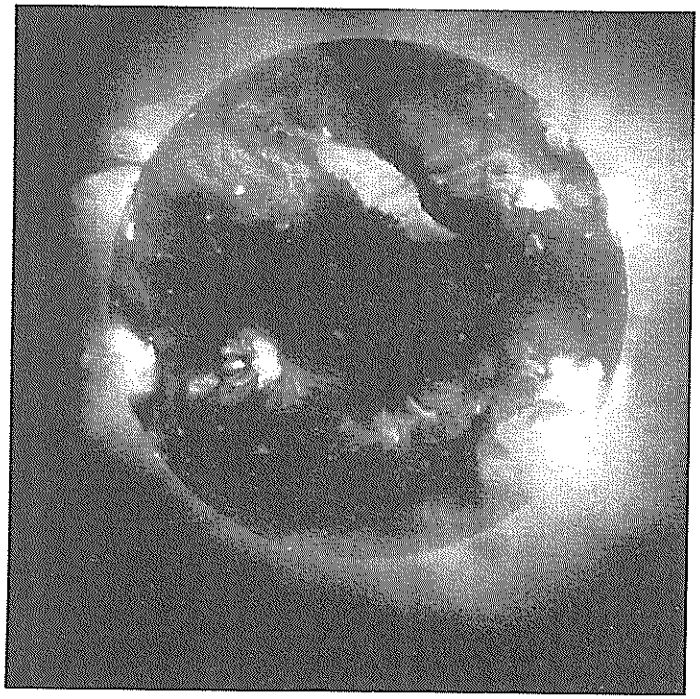
April
1999



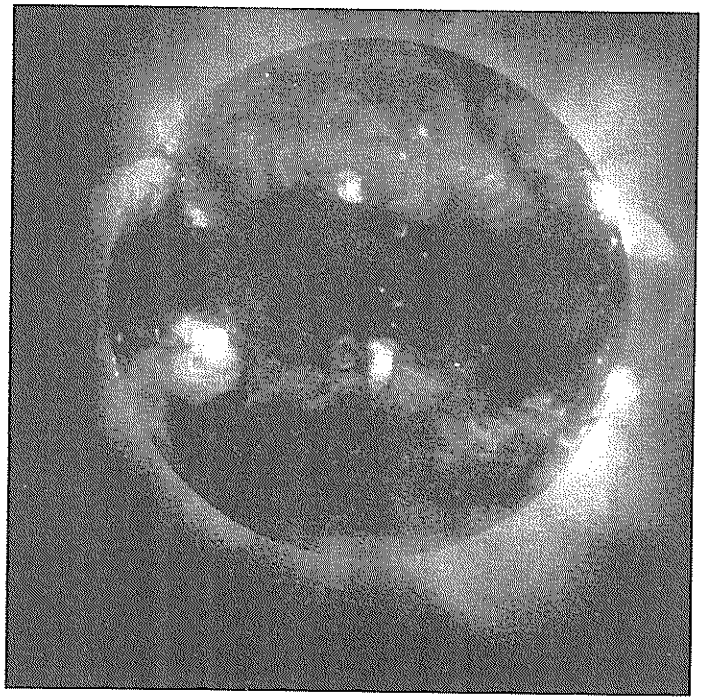
Day 17
11:05:53 UT



Day 19
11:36:11 UT



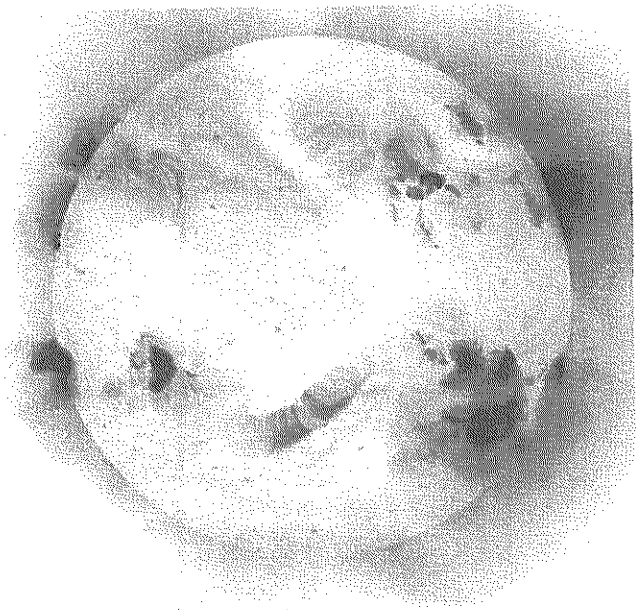
Day 18
11:19:29 UT



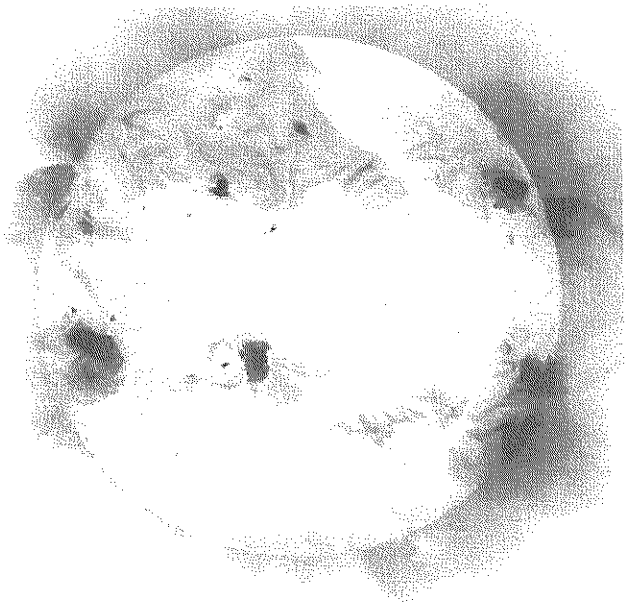
Day 20
11:43:01 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

April
1999

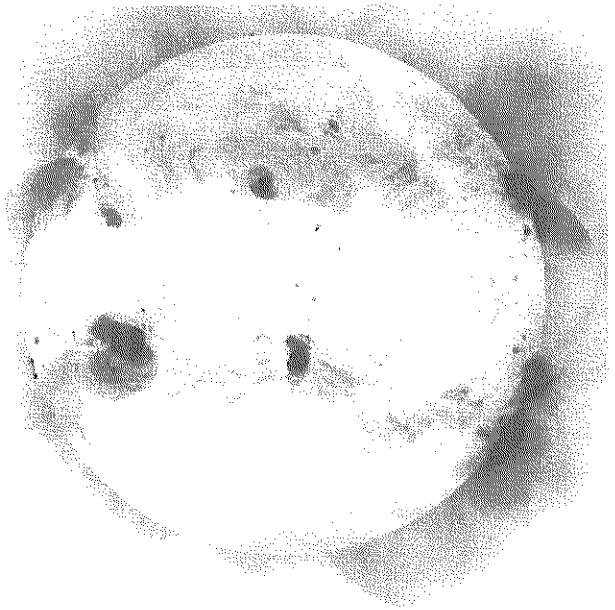


Day 17
11:05:53 UT



Day 19
11:36:11 UT

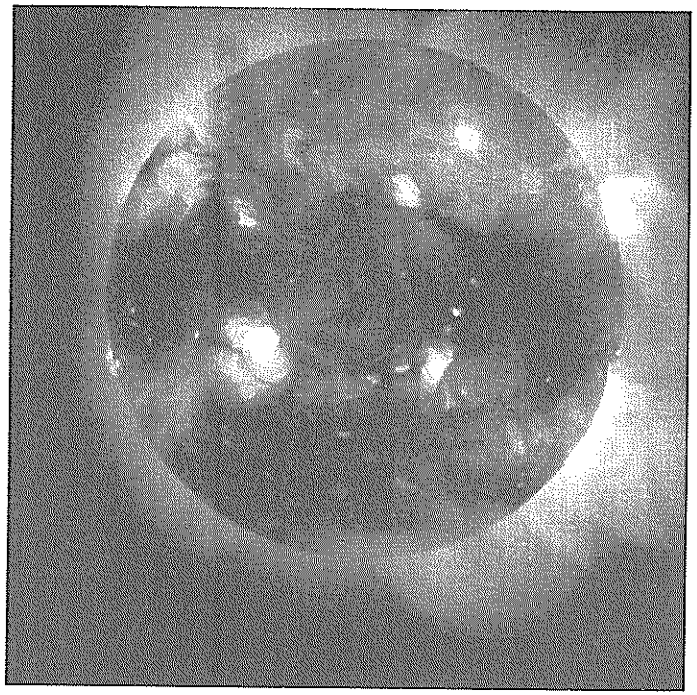
Day 18
11:19:29 UT



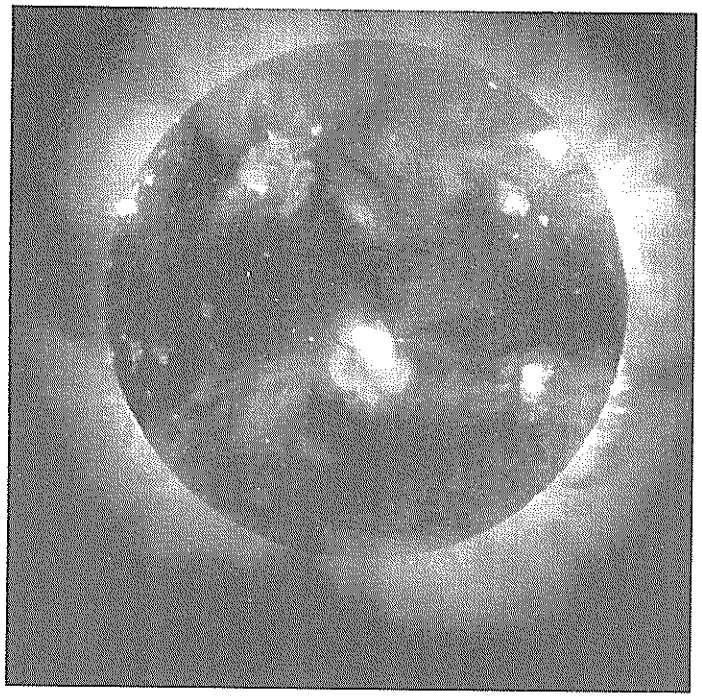
Day 20
11:43:01 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

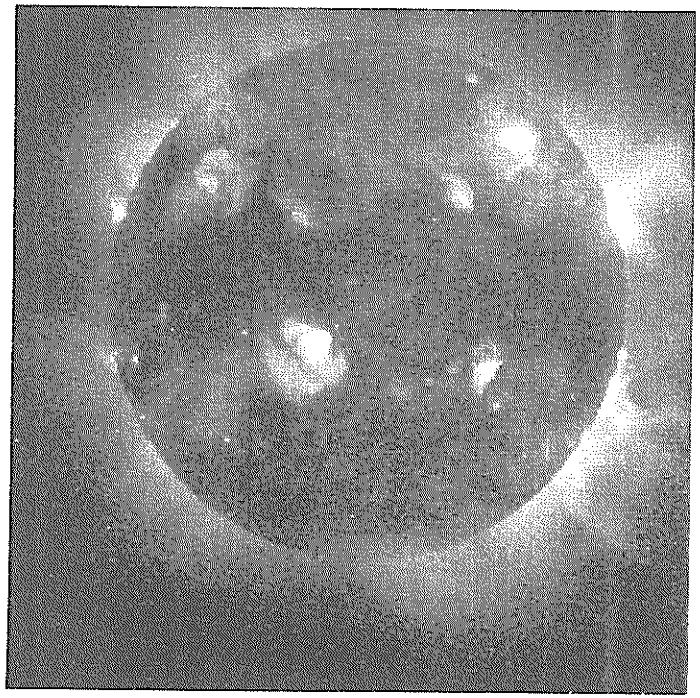
April
1999



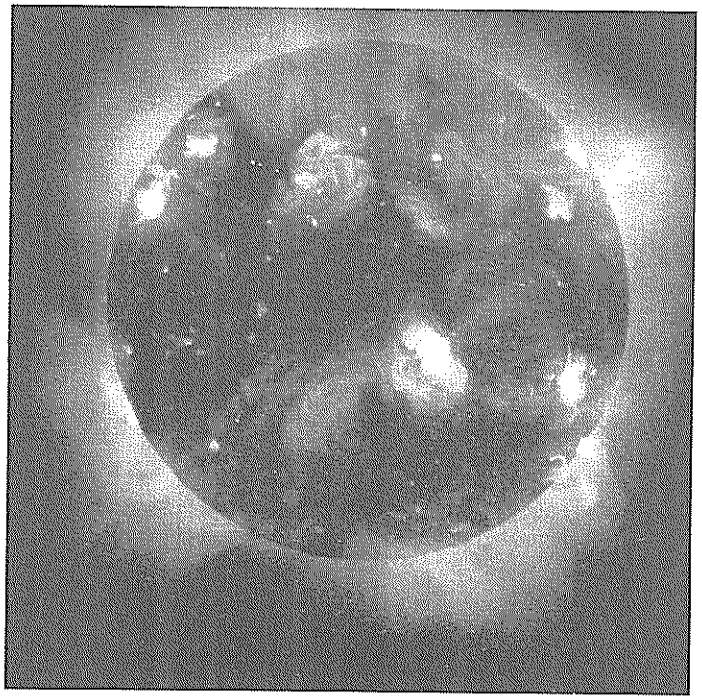
Day 21
12:06:06 UT



Day 23
11:57:48 UT



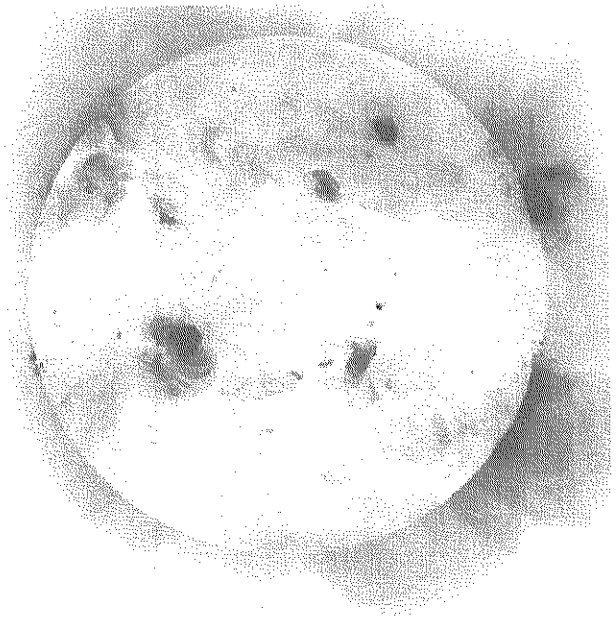
Day 22
10:43:42 UT



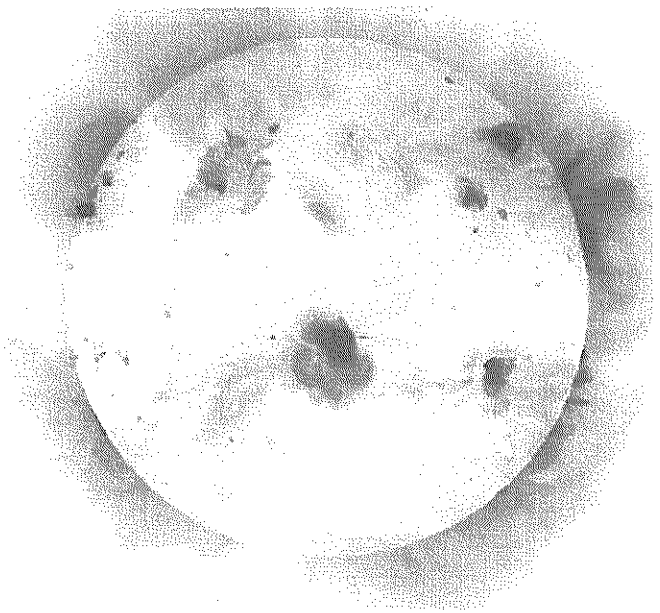
Day 24
11:14:10 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

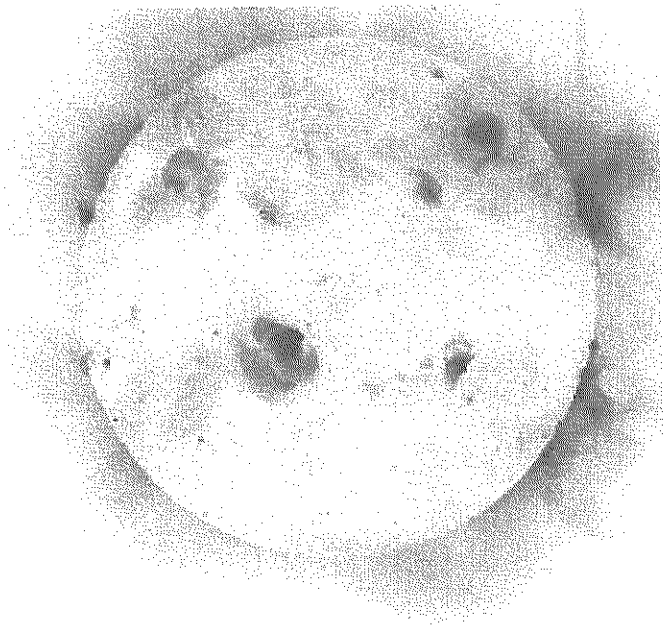
April
1999



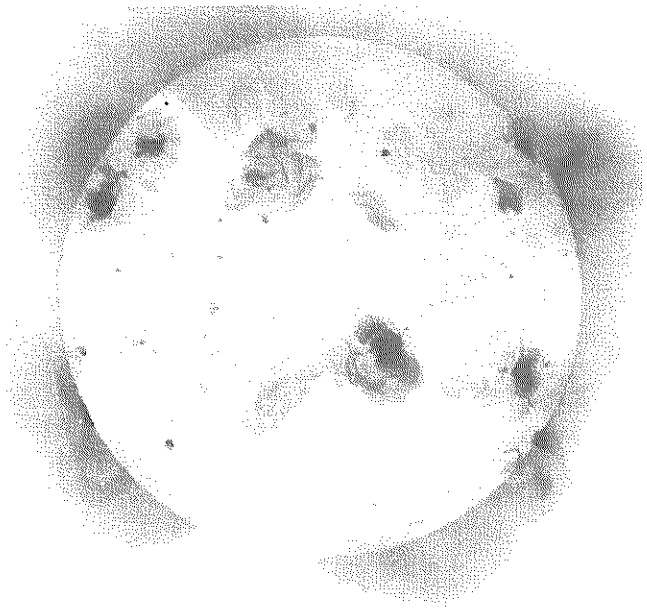
Day 21
12:06:06 UT



Day 23
11:57:48 UT



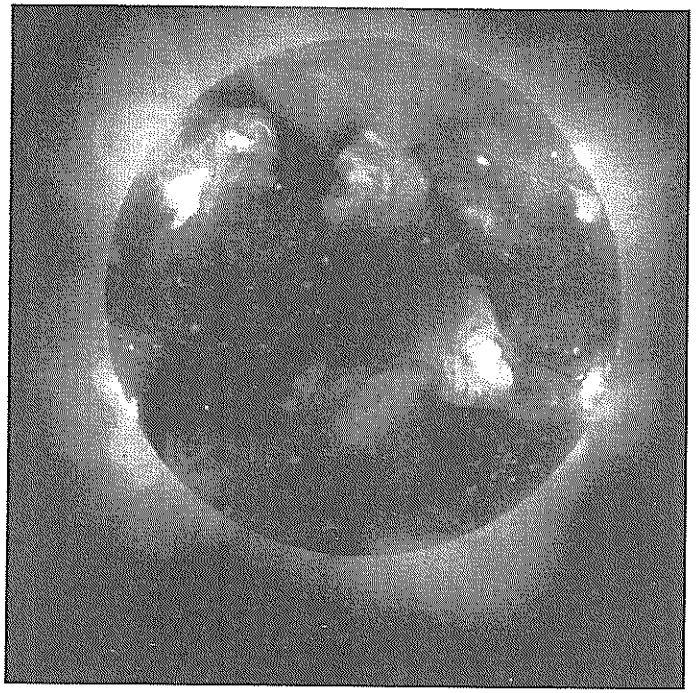
Day 22
10:43:42 UT



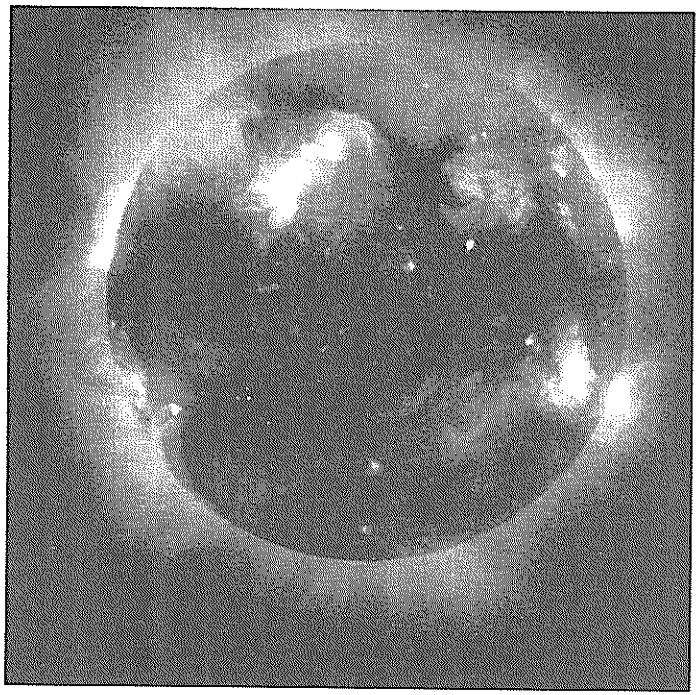
Day 24
11:14:10 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

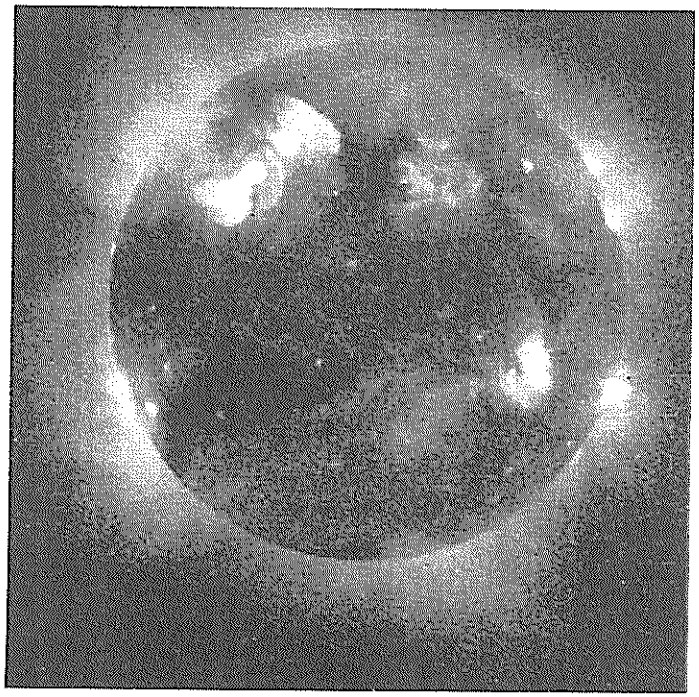
April
1999



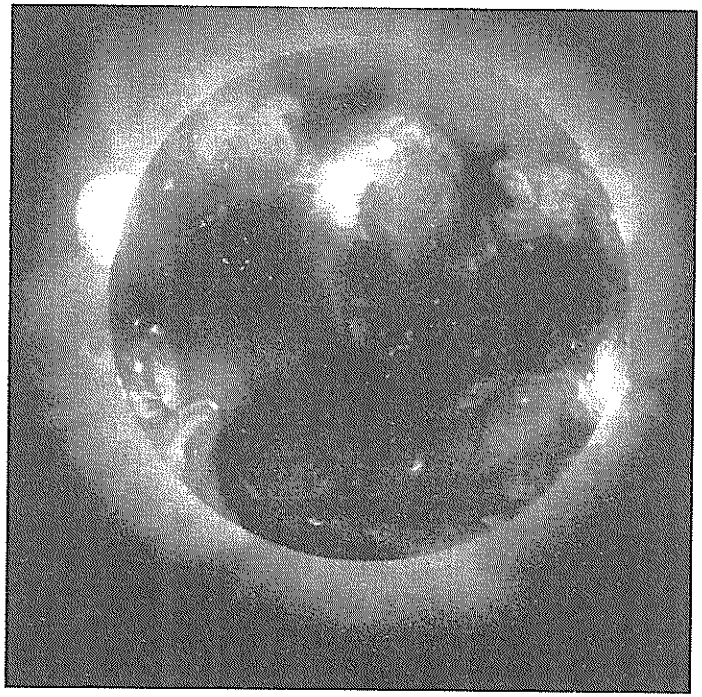
Day 25
12:26:17 UT



Day 27
10:23:39 UT



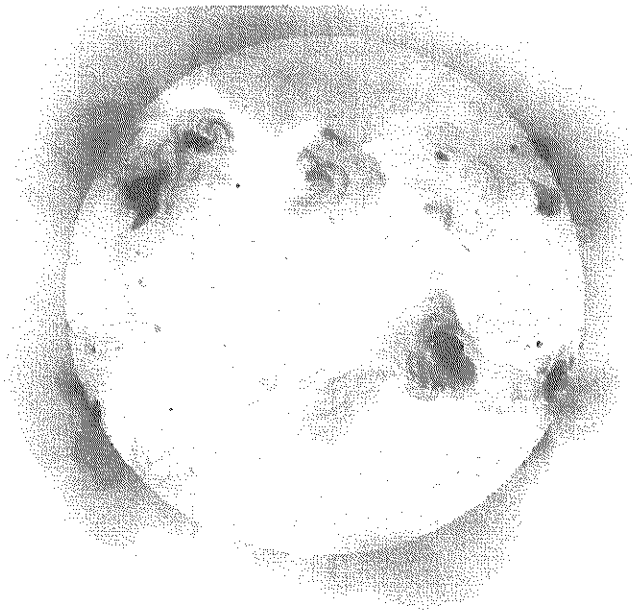
Day 26
11:45:49 UT



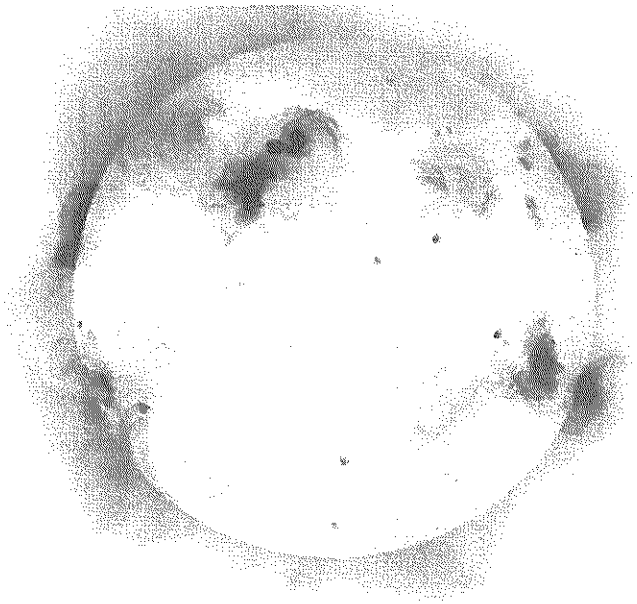
Day 28
10:37:43 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

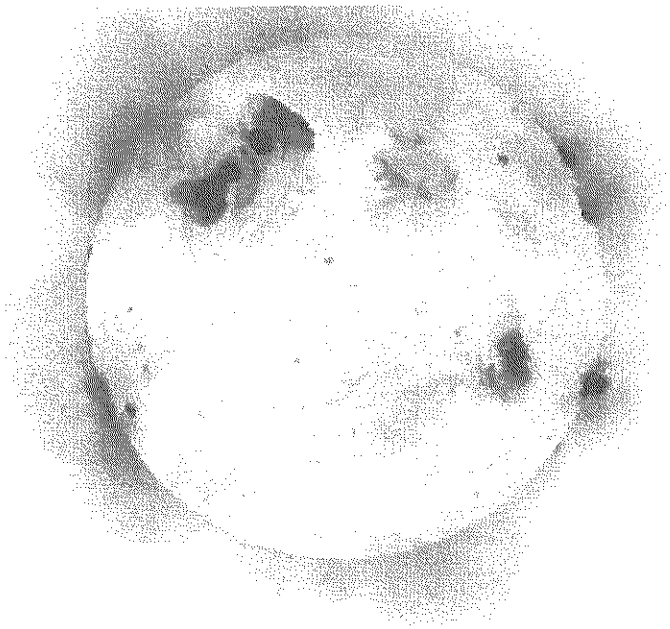
April
1999



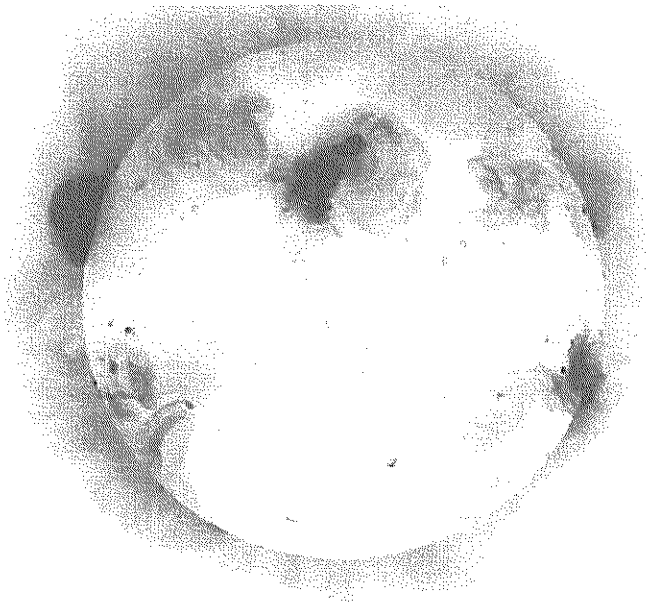
Day 25
12:26:17 UT



Day 27
10:23:39 UT



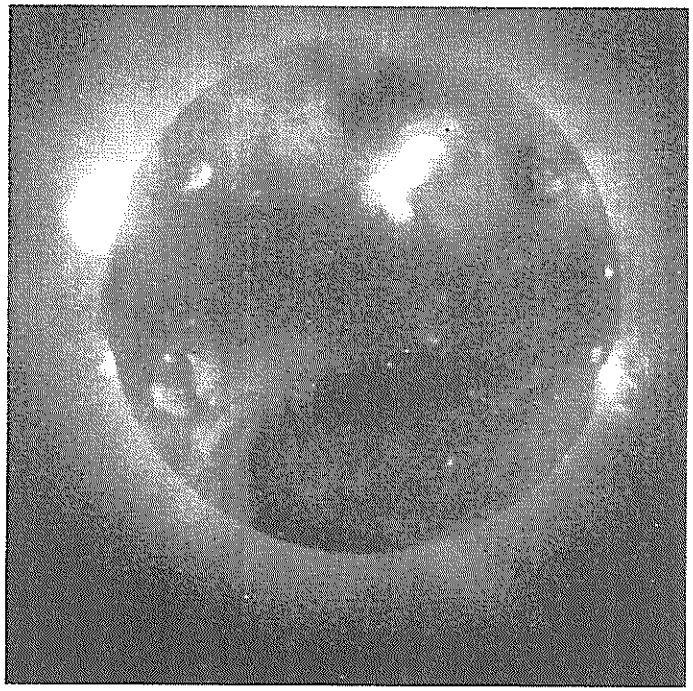
Day 26
11:45:49 UT



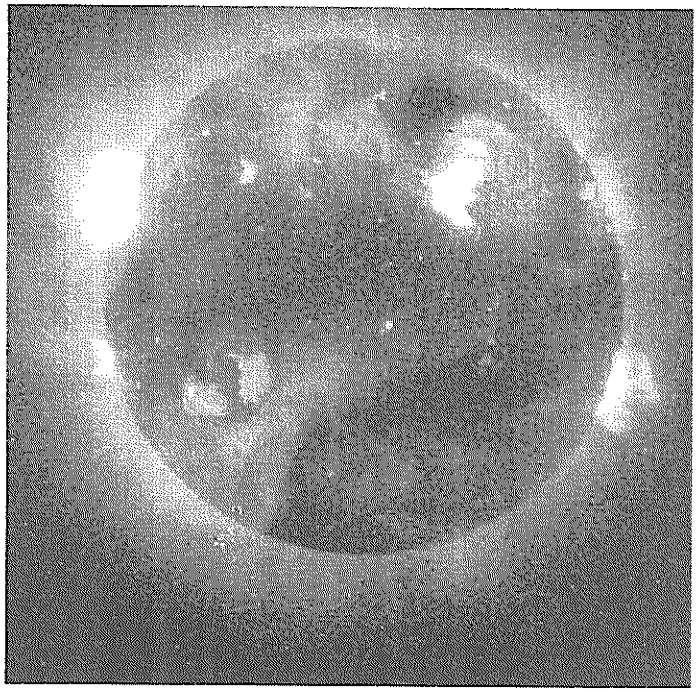
Day 28
10:37:43 UT

# YOHKOH SOFT X-RAY TELESCOPE IMAGES

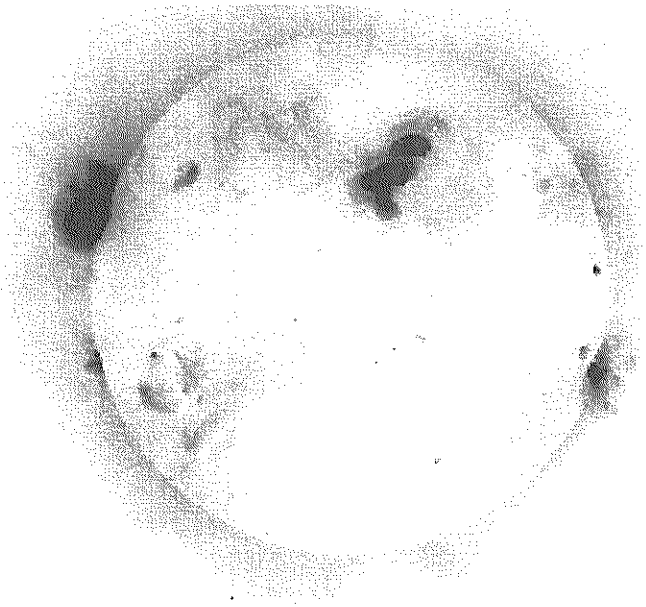
April
1999



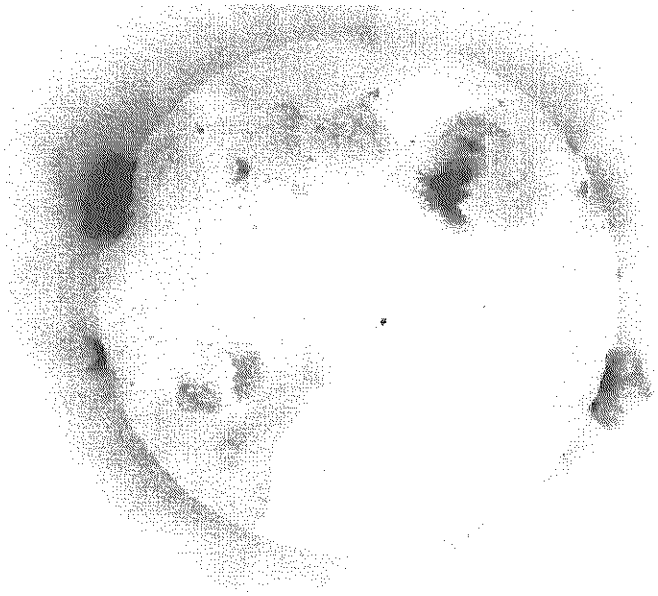
Day 29
11:50:05 UT



Day 30
11:58:04 UT

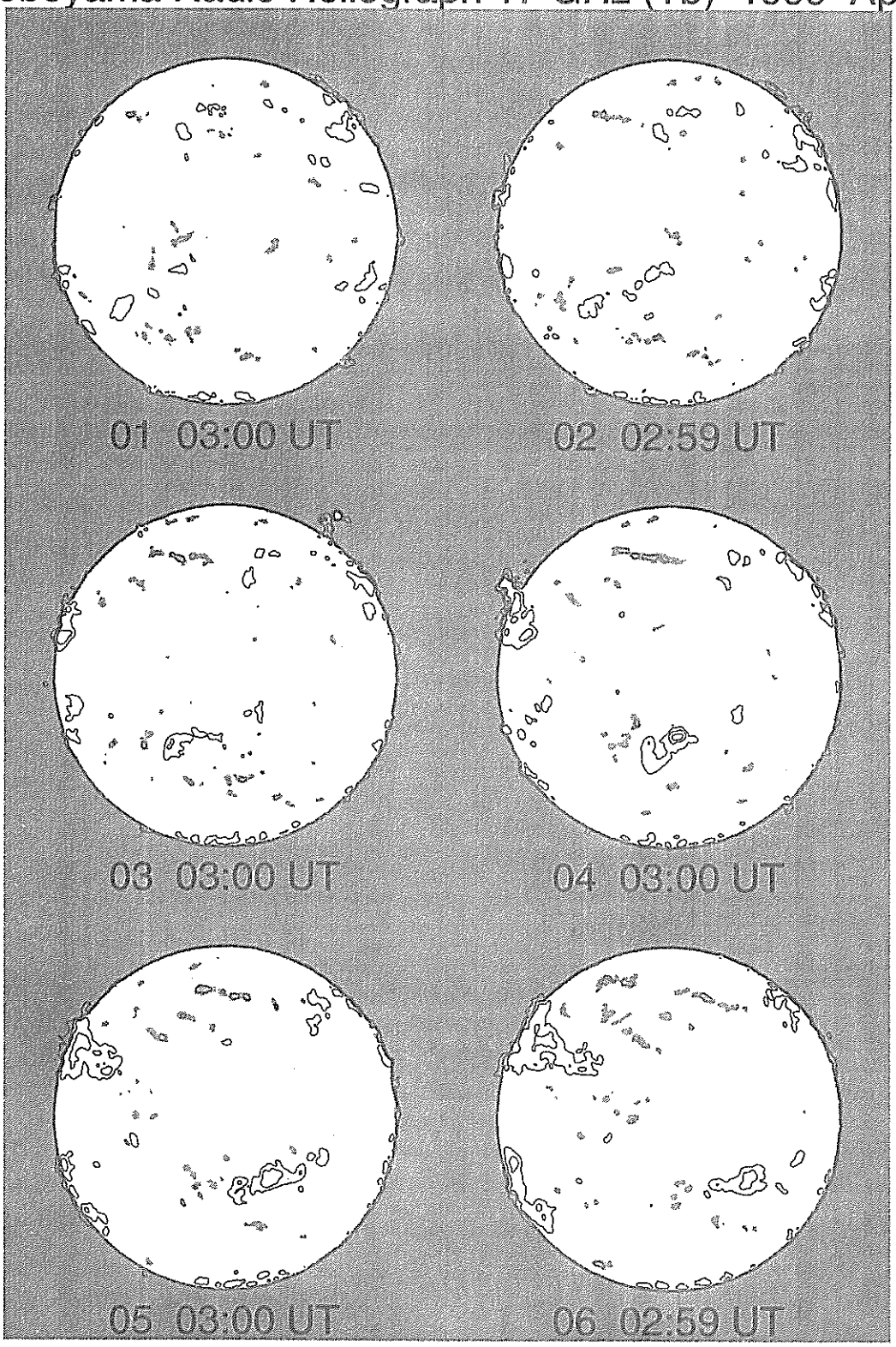


Day 29
11:50:05 UT



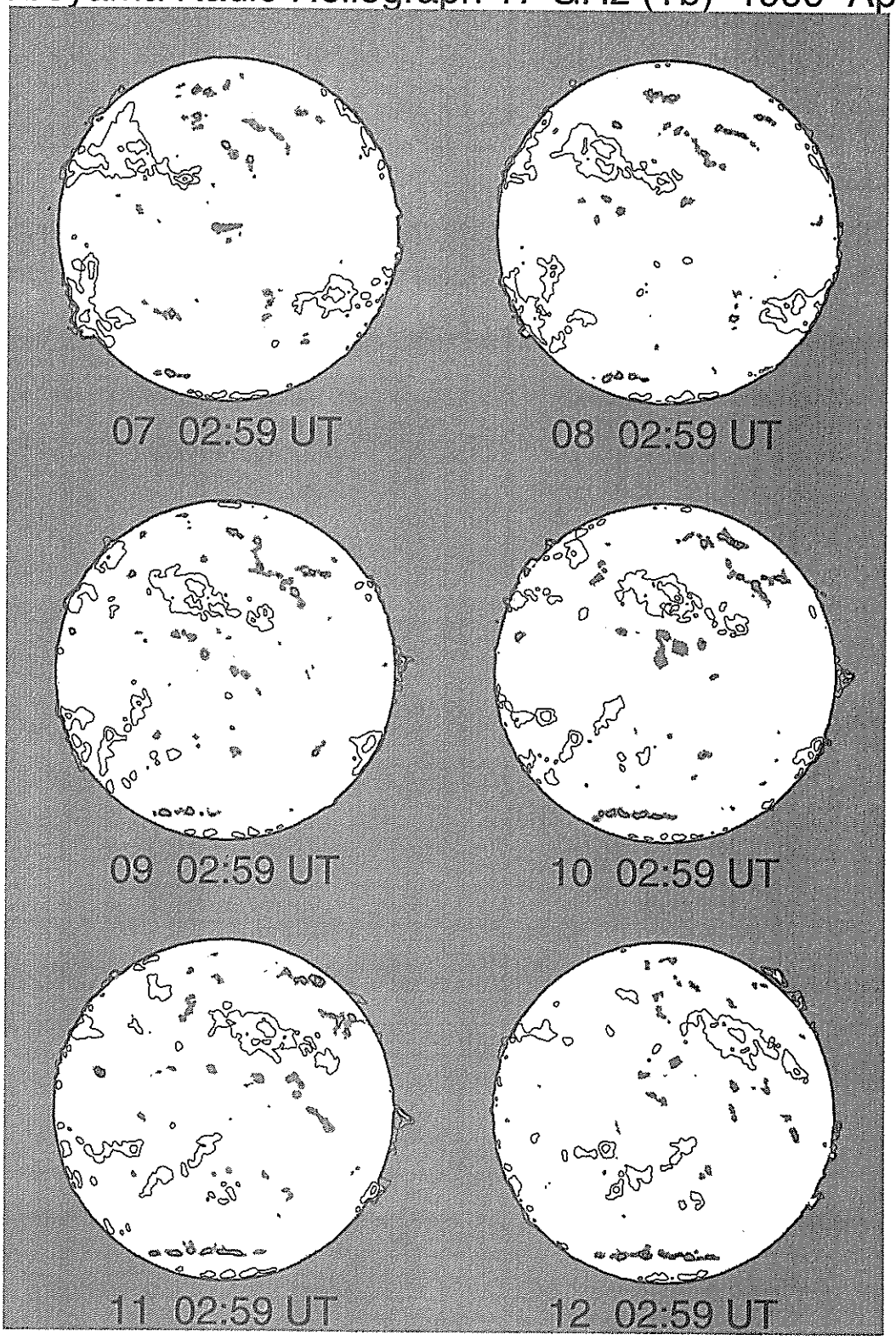
Day 30
11:58:04 UT

# Nobeyama Radio Heliograph 17 GHz (Tb) 1999 April



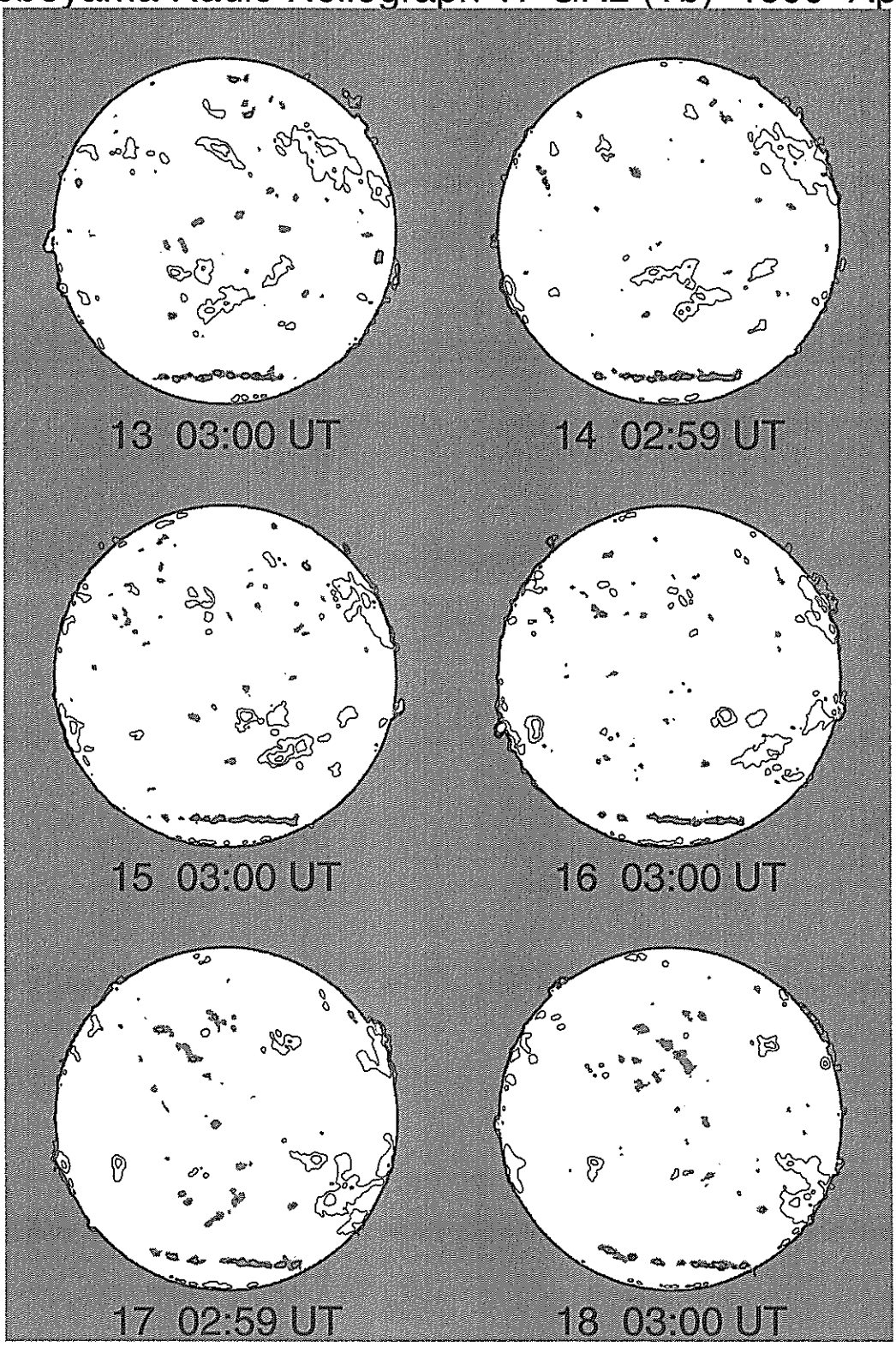

Contour Levels Tb=[5,8,12,20,50,100] x 10^3 K
Grey level Tb <= 9,500 K

# Nobeyama Radio Heliograph 17 GHz (Tb) 1999 April



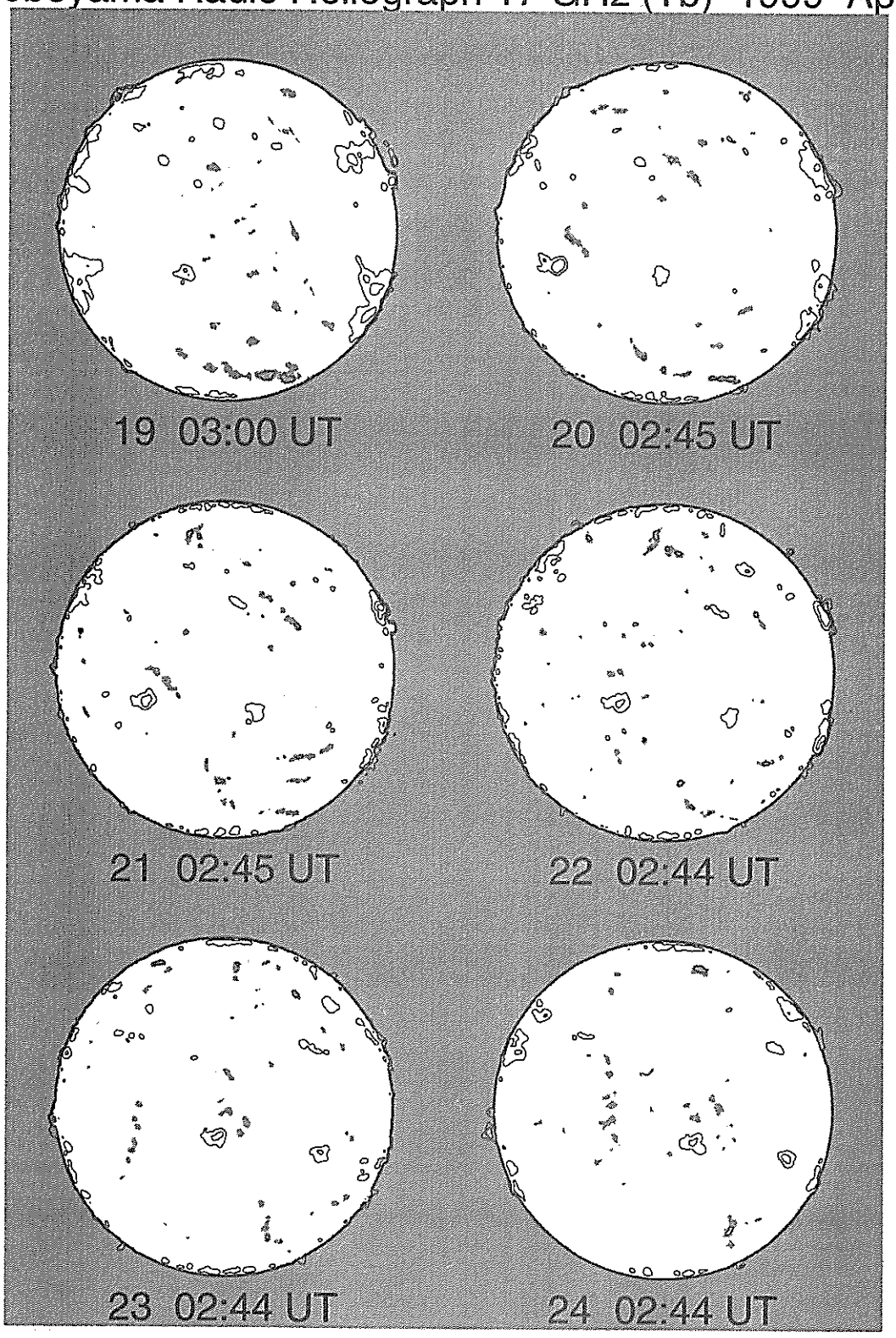

Contour Levels Tb=[5,8,12,20,50,100] x 10^3 K
Grey level Tb <= 9,500 K

# Nobeyama Radio Heliograph 17 GHz (Tb) 1999 April



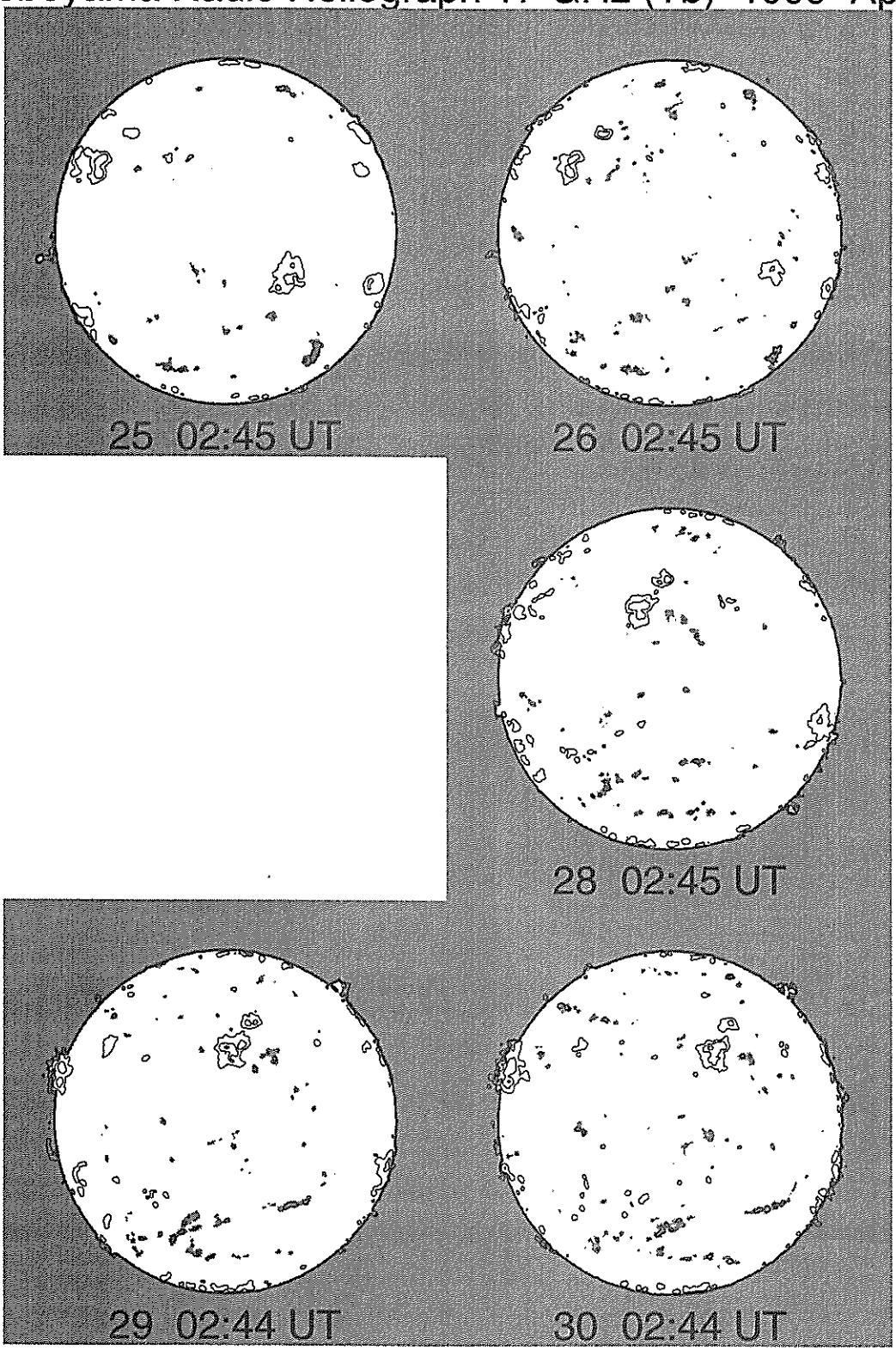

Contour Levels Tb=[5,8,12,20,50,100] x 10^3 K
Grey level Tb <= 9,500 K

# Nobeyama Radio Heliograph 17 GHz (Tb) 1999 April



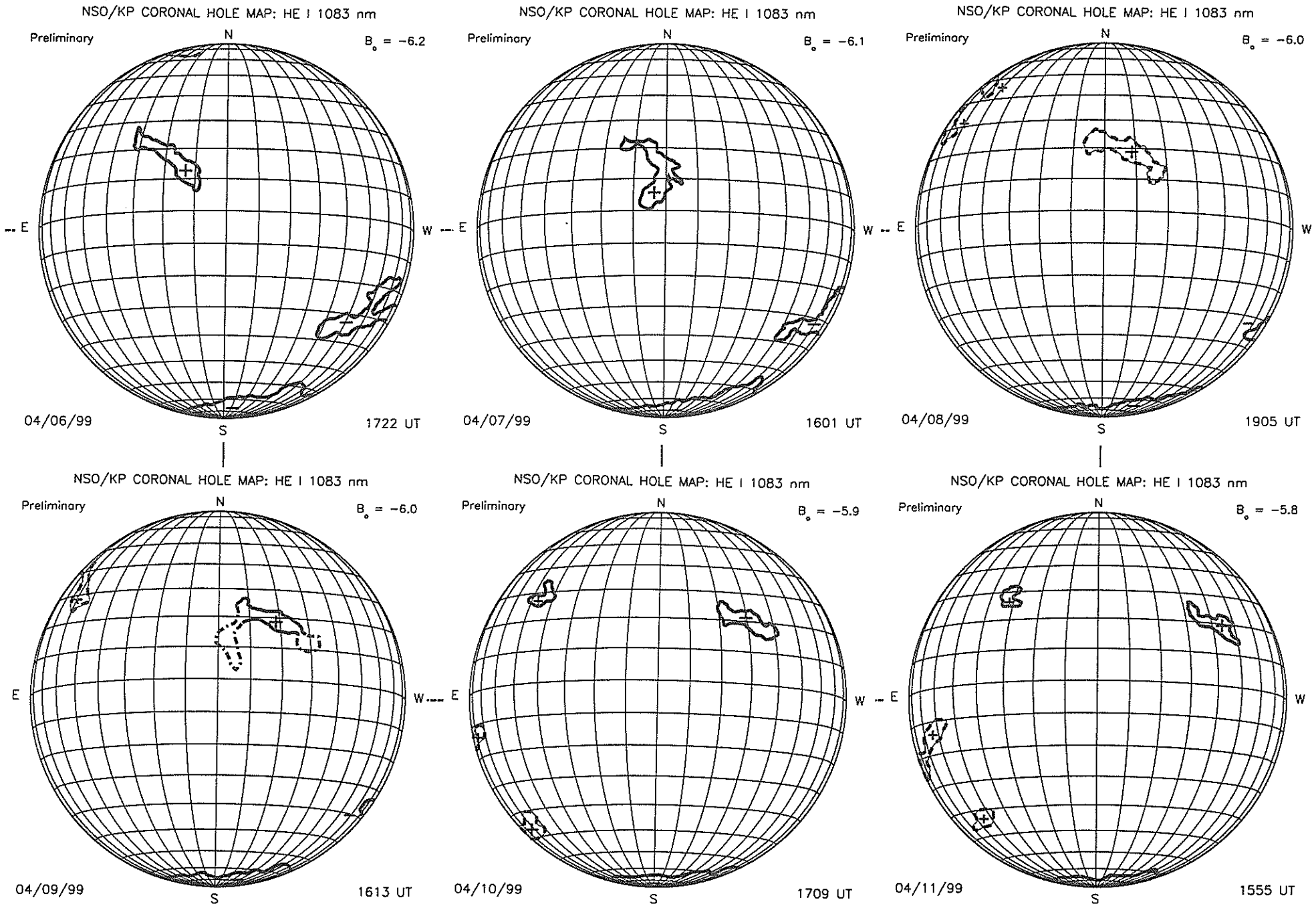

Contour Levels Tb=[5,8,12,20,50,100] x 10^3 K
Grey level Tb <= 9,500 K

# Nobeyama Radio Heliograph 17 GHz (Tb) 1999 April

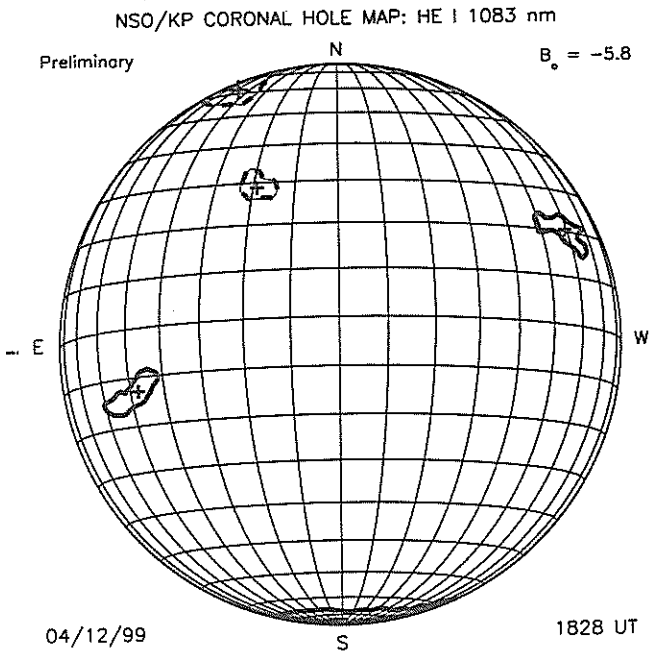


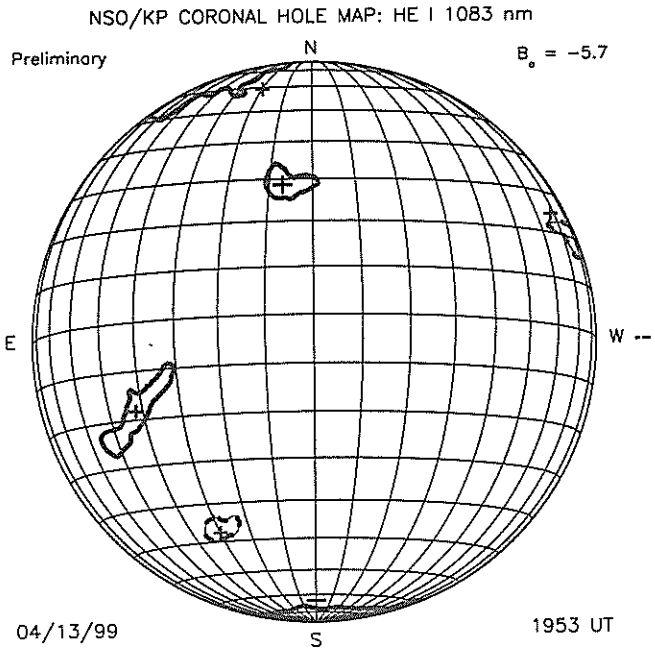

Contour Levels Tb=[5,8,12,20,50,100] x 10^3 K
Grey level Tb <= 9,500 K

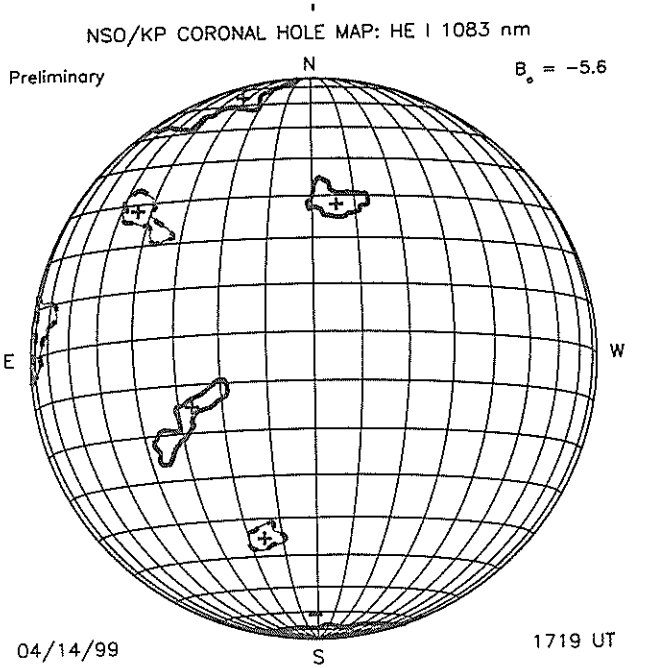
# KITT PEAK CORONAL HOLE MAPS HE I 1083 nm
## April 1999

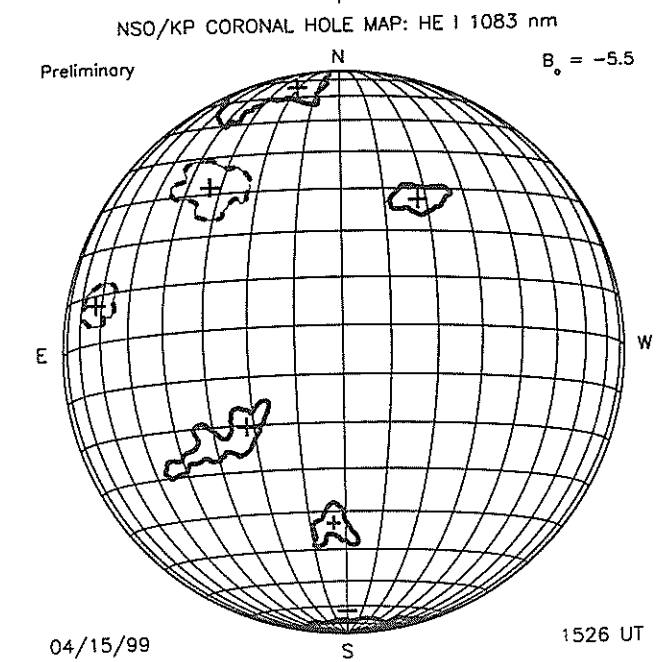


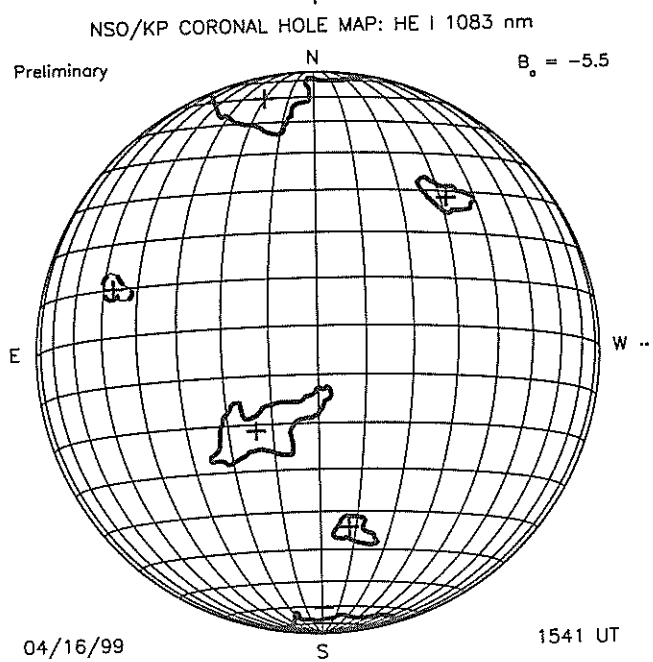
# KITT PEAK CORONAL HOLE MAPS HE I 1083 nm
## April 1999

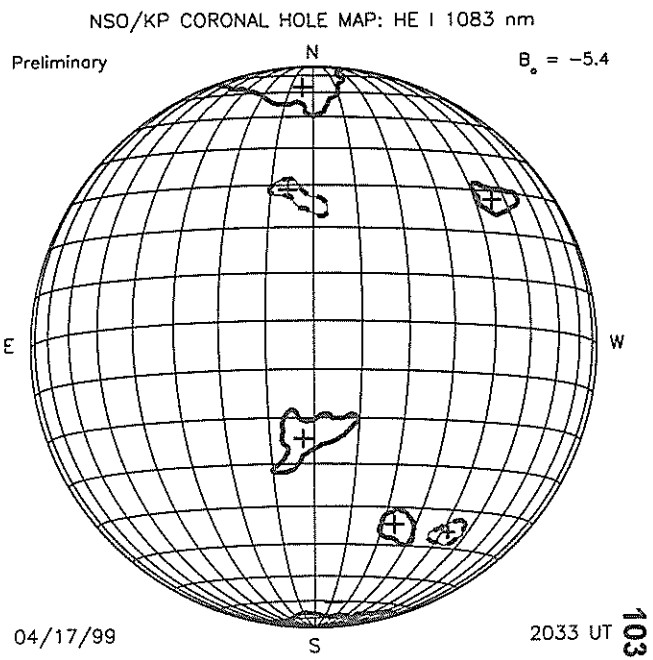


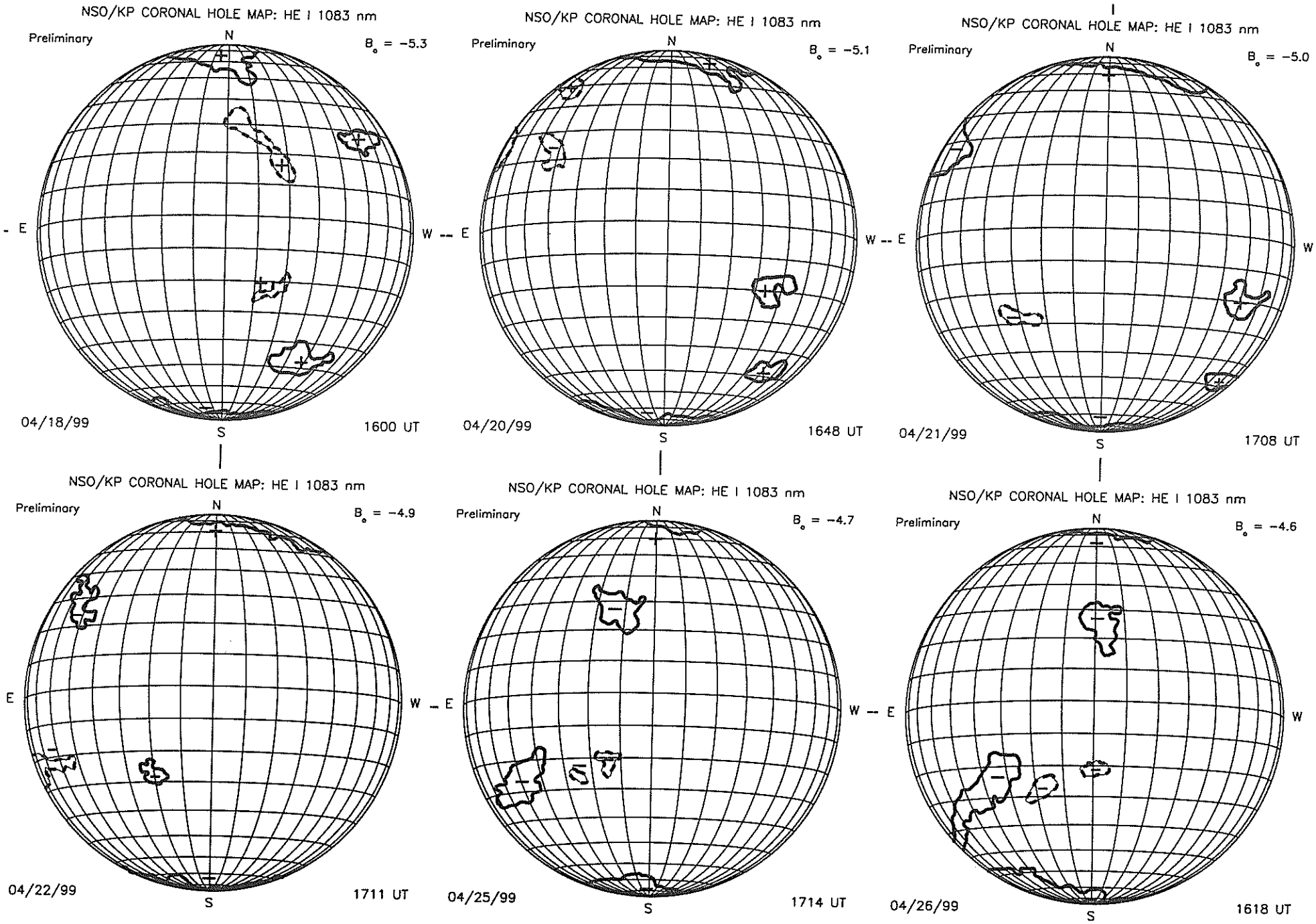



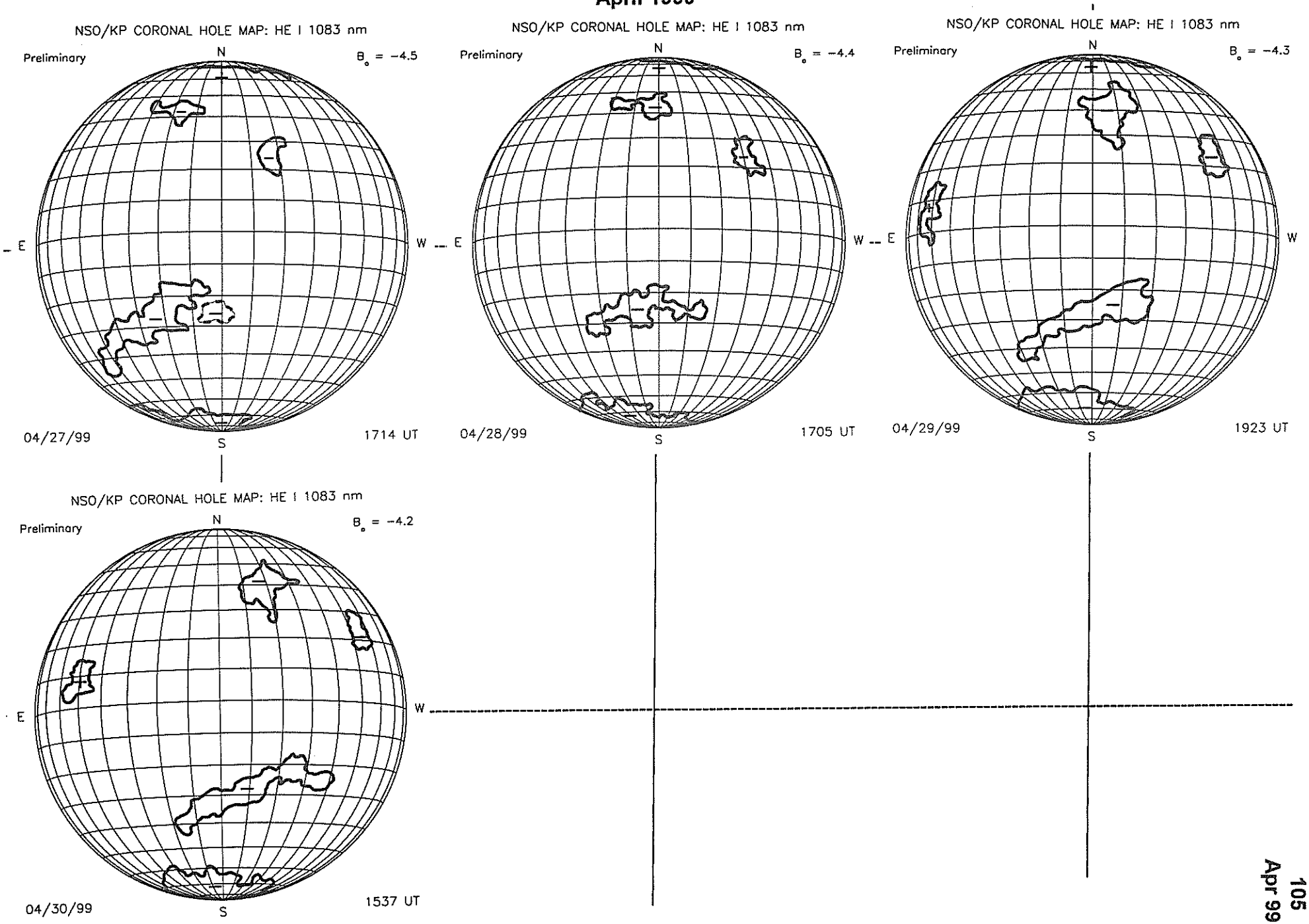



# KITT PEAK CORONAL HOLE MAPS HE I 1083 nm
## April 1999



# KITT PEAK CORONAL HOLE MAPS HE I 1083 nm
## April 1999



# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Mo Day | Time (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8501 | | RAMY | 03 27 | 1220 | N28 E72 | 04 2.1 | | B | BXO | 10 | 2 | 2 | 4 |
| 8501 | 29042 | MWIL | 03 27 | 1515 | N27 E73 | 04 2.3 | 4 | (B ) | | | | | |
| 8501 | | HOLL | 03 27 | 1608 | N27 E71 | 04 2.2 | | A | AX | 10 | 2 | 1 | 2 |
| 8501 | | TACH | 03 28 | 0434 | N29 E63 | 04 2.1 | | | AR | 21 | 2 | 1 | 4 |
| 8501 | | SVTO | 03 28 | 0701 | N29 E64 | 04 2.3 | | A | HS | 30 | 2 | 2 | 3 |
| 8501 | | RAMY | 03 28 | 1223 | N29 E62 | 04 2.4 | | B | CSO | 50 | 5 | 8 | 4 |
| 8501 | | HOLL | 03 28 | 1431 | N28 E60 | 04 2.3 | | B | CSO | 30 | 3 | 8 | 3 |
| 8501 | 29042 | MWIL | 03 28 | 1515 | N27 E60 | 04 2.3 | 4 | (BP) | | | | | |
| 8501 | | LEAR | 03 29 | 0640 | N27 E53 | 04 2.4 | | B | CAO | 40 | 4 | 6 | 3 |
| 8501 | | SVTO | 03 29 | 0713 | N28 E49 | 04 2.1 | | B | CSO | 40 | 3 | 6 | 3 |
| 8501 | | RAMY | 03 29 | 1200 | N27 E47 | 04 2.2 | | A | HS | 20 | 2 | 2 | 4 |
| 8501 | | HOLL | 03 29 | 1503 | N28 E47 | 04 2.3 | | B | CSO | 30 | 3 | 5 | 4 |
| 8501 | 29042 | MWIL | 03 29 | 1530 | N28 E47 | 04 2.3 | 5 | (BP) | | | | | |
| 8501 | | TACH | 03 30 | 0504 | N27 E38 | 04 2.2 | | | AR | 33 | 3 | 1 | 3 |
| 8501 | | SVTO | 03 30 | 0610 | N27 E38 | 04 2.2 | | A | HS | 20 | 2 | 1 | 3 |
| 8501 | | RAMY | 03 30 | 1143 | N27 E35 | 04 2.2 | | A | HS | 10 | 2 | 2 | 4 |
| 8501 | 29042 | MWIL | 03 30 | 1530 | N27 E33 | 04 2.2 | 4 | (AP) | | | | | |
| 8501 | | LEAR | 03 31 | 0141 | N27 E28 | 04 2.2 | | A | HS | 20 | 1 | 1 | 3 |
| 8501 | | SVTO | 03 31 | 0726 | N27 E25 | 04 2.2 | | A | HR | 10 | 1 | | 3 |
| 8501 | | RAMY | 03 31 | 1233 | N27 E21 | 04 2.1 | | A | AX | | 1 | | 4 |
| 8501 | | LEAR | 04 01 | 0118 | N26 E16 | 04 2.3 | | A | HS | 10 | 1 | | 3 |
| 8501 | | TACH | 04 01 | 0404 | N26 E14 | 04 2.2 | | | AXX | 15 | 1 | 1 | 3 |
| 8501 | | SVTO | 04 01 | 0820 | N28 E13 | 04 2.4 | | B | BXO | 10 | 2 | 5 | 3 |
| 8502 | | RAMY | 03 28 | 1223 | S25 E75 | 04 3.3 | | A | AX | | 1 | | 4 |
| 8502 | | HOLL | 03 28 | 1431 | S26 E79 | 04 3.7 | | A | AX | | 1 | | 3 |
| 8502 | | LEAR | 03 29 | 0640 | S28 E70 | 04 3.7 | | A | HA | 180 | 2 | 2 | 3 |
| 8502 | | SVTO | 03 29 | 0713 | S27 E70 | 04 3.7 | | B | CSO | 80 | 3 | 17 | 3 |
| 8502 | | RAMY | 03 29 | 1200 | S28 E69 | 04 3.9 | | B | CSO | 30 | 2 | 15 | 4 |
| 8502 | | HOLL | 03 29 | 1503 | S26 E70 | 04 4.1 | | B | FAO | 90 | 4 | 17 | 4 |
| 8502 | | SVTO | 03 30 | 0610 | S27 E62 | 04 4.1 | | B | FAO | 80 | 4 | 18 | 3 |
| 8502 | | RAMY | 03 30 | 1143 | S27 E59 | 04 4.1 | | B | FAO | 100 | 8 | 18 | 4 |
| 8502 | | LEAR | 04 01 | 0118 | S27 E29 | 04 3.3 | | A | HS | 10 | 1 | 1 | 3 |
| 8502 | | TACH | 04 01 | 0404 | S27 E28 | 04 3.3 | | | AXX | 25 | 1 | 1 | 3 |
| 8502 | | SVTO | 04 01 | 0820 | S28 E27 | 04 3.4 | | A | HR | 10 | 2 | 1 | 3 |
| 8502 | | RAMY | 04 01 | 1152 | S27 E24 | 04 3.4 | | A | AX | | 1 | | 3 |
| 8502 | | HOLL | 04 01 | 1513 | S27 E22 | 04 3.3 | | A | AX | 10 | 1 | | 3 |
| 8502 | 29045 | MWIL | 04 01 | 1530 | S28 E22 | 04 3.4 | 2 | AP | | | | | |
| 8502 | | LEAR | 04 02 | 0116 | S28 E17 | 04 3.4 | | A | AX | 10 | 1 | | 4 |
| 8502 | | TACH | 04 02 | 0412 | S26 E15 | 04 3.3 | | | AXX | 10 | 1 | 1 | 3 |
| 8502 | | SVTO | 04 02 | 0805 | S27 E13 | 04 3.3 | | A | AX | | 1 | | 3 |
| 8502 | | KAND | 04 02 | 1220 | S27 E11 | 04 3.4 | | | AX | | 1 | | 3 |
| 8502 | | RAMY | 04 02 | 1327 | S27 E10 | 04 3.3 | | A | AX | | 1 | | 3 |
| 8502 | 29045 | MWIL | 04 02 | 1500 | S27 E13 | 04 3.6 | 4 | (BG) | | | | | |
| 8502 | | LEAR | 04 03 | 0610 | S26 E07 | 04 3.8 | | B | DSO | 30 | 4 | 3 | 2 |
| 8502 | 29045 | MWIL | 04 04 | 1500 | S27 W11 | 04 3.8 | 5 | (B ) | | | | | |
| 8502 | 29045 | MWIL | 04 05 | 1500 | S27 W24 | 04 3.7 | 5 | (D ) | | | | | |
| 8502 | 29045 | MWIL | 04 09 | 2300 | S27 W85 | 04 3.3 | 4 | AP | | | | | |
| 8502A | 29045 | MWIL | 03 29 | 1530 | S27 E64 | 04 3.6 | 4 | (BG) | | | | | |
| 8502A | | TACH | 03 30 | 0504 | S27 E54 | 04 3.4 | | | HS | 40 | 1 | 1 | 3 |
| 8502A | 29045 | MWIL | 03 30 | 1530 | S27 E50 | 04 3.5 | 4 | (BP) | | | | | |
| 8502A | | LEAR | 03 31 | 0141 | S28 E43 | 04 3.4 | | B | CSO | 20 | 3 | 3 | 3 |
| 8502A | | SVTO | 03 31 | 0726 | S27 E38 | 04 3.3 | | A | HA | 10 | 1 | 1 | 3 |
| 8502A | | RAMY | 03 31 | 1233 | S27 E36 | 04 3.3 | | A | AX | 10 | 2 | 1 | 4 |
| 8502A | | RAMY | 04 02 | 1327 | S26 E16 | 04 3.8 | | B | BXO | | 3 | 2 | 3 |
| 8502A | | SVTO | 04 03 | 0740 | S26 E06 | 04 3.8 | | B | BXO | 10 | 3 | 4 | 2 |
| 8506 | | KAND | 04 03 | 1035 | S25 E04 | 04 3.7 | | | BXO | | 3 | 3 | 2 |
| 8506 | | RAMY | 04 03 | 1246 | S26 E04 | 04 3.8 | | B | BXO | 10 | 10 | 3 | 3 |
| 8506 | | HOLL | 04 03 | 1635 | S26 E03 | 04 3.9 | | B | DSO | 50 | 10 | 4 | 3 |
| 8506 | | LEAR | 04 04 | 0045 | S25 W03 | 04 3.8 | | B | DAO | 50 | 17 | 6 | 3 |
| 8506 | | SVTO | 04 04 | 0650 | S26 W07 | 04 3.7 | | BG | DAI | 80 | 21 | 6 | 3 |
| 8506 | | RAMY | 04 04 | 1215 | S26 W08 | 04 3.9 | | BG | DAO | 100 | 14 | 7 | 4 |
| 8506 | | HOLL | 04 04 | 1504 | S26 W10 | 04 3.8 | | B | DSO | 160 | 17 | 8 | 3 |
| 8506 | | LEAR | 04 05 | 0057 | S25 W16 | 04 3.8 | | BG | DAO | 180 | 19 | 8 | 4 |
| 8506 | | SVTO | 04 05 | 0548 | S26 W18 | 04 3.8 | | BG | EAI | 460 | 30 | 11 | 3 |
| 8506 | | KAND | 04 05 | 0745 | S26 W20 | 04 3.8 | | | DAO | | 24 | 9 | 3 |
| 8506 | | LEAR | 04 06 | 0140 | S26 W30 | 04 3.7 | | BG | ESO | 200 | 21 | 11 | 3 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8506 | | SVTO | 04 06 0610 | S26 W34 | 04 3.6 | | B | EAO | 430 | 22 | 12 | 3 |
| 8506 | | KAND | 04 06 0700 | S27 W34 | 04 3.6 | | | EAO | | 17 | 11 | 3 |
| 8506 | | TACH | 04 06 0730 | S27 W32 | 04 3.8 | | | DAI | 715 | 18 | 10 | 2 |
| 8506 | | RAMY | 04 06 1216 | S27 W35 | 04 3.8 | | B | ESO | 220 | 24 | 11 | 3 |
| 8506 | | HOLL | 04 06 1540 | S27 W38 | 04 3.7 | | BG | EAO | 180 | 18 | 11 | 3 |
| 8506 | | LEAR | 04 07 0058 | S25 W44 | 04 3.6 | | BG | EAO | 210 | 18 | 13 | 4 |
| 8506 | | SVTO | 04 07 0711 | S26 W45 | 04 3.8 | | B | EAO | 210 | 10 | 11 | 3 |
| 8506 | | KAND | 04 07 0750 | S27 W46 | 04 3.7 | | | EAO | | 5 | 13 | 2 |
| 8506 | | RAMY | 04 07 1228 | S27 W49 | 04 3.7 | | B | ESO | 200 | 13 | 12 | 3 |
| 8506 | | LEAR | 04 08 0045 | S25 W57 | 04 3.6 | | BG | EAO | 140 | 9 | 11 | 4 |
| 8506 | | TACH | 04 08 0455 | S26 W57 | 04 3.8 | | | CSO | 155 | 2 | 10 | 3 |
| 8506 | | SVTO | 04 08 0650 | S26 W60 | 04 3.6 | | B | CKO | 120 | 4 | 11 | 3 |
| 8506 | | KAND | 04 08 0730 | S27 W60 | 04 3.6 | | | ESO | | 2 | 12 | 4 |
| 8506 | | RAMY | 04 08 1602 | S27 W63 | 04 3.7 | | B | CHO | 110 | 3 | 10 | 3 |
| 8506 | | HOLL | 04 08 1657 | S27 W65 | 04 3.6 | | B | CAO | 160 | 4 | 11 | 3 |
| 8506 | | LEAR | 04 09 0110 | S26 W69 | 04 3.7 | | B | DAO | 120 | 5 | 11 | 3 |
| 8506 | | KAND | 04 09 0620 | S27 W77 | 04 3.3 | | | HS | | 2 | 2 | 5 |
| 8506 | | RAMY | 04 09 1310 | S30 W79 | 04 3.3 | | A | HA | 100 | 2 | 5 | 3 |
| 8506 | | HOLL | 04 09 1623 | S27 W78 | 04 3.6 | | B | CAO | 160 | 3 | 9 | 3 |
| 8506 | | LEAR | 04 10 0012 | S26 W83 | 04 3.5 | | A | HA | 80 | 2 | 3 | 4 |
| 8504 | 29046 | MWIL | 03 29 1530 | S29 E78 | 04 4.8 | 4 | AF | | | | | |
| 8504 | | TACH | 03 30 0504 | S29 E69 | 04 4.6 | | | HA | 161 | 3 | 2 | 3 |
| 8504 | 29046 | MWIL | 03 30 1530 | S29 E65 | 04 4.7 | 5 | (BF) | | | | | |
| 8504 | | LEAR | 03 31 0141 | S29 E59 | 04 4.7 | | A | HS | 120 | 3 | 2 | 3 |
| 8504 | | SVTO | 03 31 0726 | S28 E55 | 04 4.6 | | B | CSO | 70 | 4 | 7 | 3 |
| 8504 | | RAMY | 03 31 1233 | S28 E52 | 04 4.6 | | B | CAO | 90 | 4 | 6 | 4 |
| 8504 | | LEAR | 04 01 0118 | S29 E46 | 04 4.7 | | B | CAO | 100 | 4 | 4 | 3 |
| 8504 | | TACH | 04 01 0404 | S28 E46 | 04 4.8 | | | HA | 180 | 3 | 2 | 3 |
| 8504 | | SVTO | 04 01 0820 | S28 E44 | 04 4.8 | | A | HS | 130 | 4 | 2 | 3 |
| 8504 | | RAMY | 04 01 1152 | S28 E42 | 04 4.8 | | B | CSO | 100 | 4 | 3 | 3 |
| 8504 | | HOLL | 04 01 1513 | S28 E41 | 04 4.8 | | A | HA | 90 | 4 | 2 | 3 |
| 8504 | 29046 | MWIL | 04 01 1530 | S29 E41 | 04 4.9 | 4 | AF | | | | | |
| 8504 | | LEAR | 04 02 0116 | S28 E36 | 04 4.9 | | B | CSO | 80 | 6 | 3 | 4 |
| 8504 | | TACH | 04 02 0412 | S26 E32 | 04 4.7 | | | HA | 170 | 2 | 2 | 3 |
| 8504 | | SVTO | 04 02 0805 | S28 E31 | 04 4.7 | | B | CAO | 80 | 6 | 5 | 3 |
| 8504 | | KAND | 04 02 1220 | S27 E23 | 04 4.3 | | | CAO | | 11 | 15 | 3 |
| 8504 | | RAMY | 04 02 1327 | S28 E26 | 04 4.6 | | B | CSO | 60 | 9 | 7 | 3 |
| 8504 | 29046 | MWIL | 04 02 1500 | S28 E29 | 04 4.9 | 5 | (BF) | | | | | |
| 8504 | | LEAR | 04 03 0610 | S29 E19 | 04 4.7 | | BG | DSO | 80 | 10 | 6 | 2 |
| 8504 | | SVTO | 04 03 0740 | S28 E19 | 04 4.8 | | BG | DSO | 60 | 8 | 4 | 2 |
| 8504 | | KAND | 04 03 1035 | S28 E18 | 04 4.8 | | | DSO | | 7 | 4 | 2 |
| 8504 | | RAMY | 04 03 1246 | S28 E17 | 04 4.9 | | B | CAO | 70 | 11 | 6 | 3 |
| 8504 | | HOLL | 04 03 1635 | S29 E15 | 04 4.9 | | B | DSO | 60 | 9 | 5 | 3 |
| 8504 | | LEAR | 04 04 0045 | S28 E09 | 04 4.7 | | B | CAO | 50 | 8 | 4 | 3 |
| 8504 | | SVTO | 04 04 0650 | S28 E06 | 04 4.7 | | B | DSO | 40 | 12 | 4 | 3 |
| 8504 | | RAMY | 04 04 1215 | S27 E04 | 04 4.8 | | B | DSO | 50 | 11 | 4 | 4 |
| 8504 | 29046 | MWIL | 04 04 1500 | S28 E02 | 04 4.8 | 4 | (BF) | | | | | |
| 8504 | | HOLL | 04 04 1504 | S28 E02 | 04 4.8 | | B | CSO | 60 | 10 | 5 | 3 |
| 8504 | | LEAR | 04 05 0057 | S27 W05 | 04 4.6 | | B | DAO | 20 | 13 | 5 | 4 |
| 8504 | | SVTO | 04 05 0548 | S28 W05 | 04 4.8 | | BG | DSI | 90 | 12 | 5 | 3 |
| 8504 | | KAND | 04 05 0745 | S28 W05 | 04 4.9 | | | CAO | | 10 | 4 | 3 |
| 8504 | 29046 | MWIL | 04 05 1500 | S28 W10 | 04 4.8 | 4 | (BF) | | | | | |
| 8504 | 29050 | MWIL | 04 05 1500 | S34 W08 | 04 5.0 | 4 | (AF) | | | | | |
| 8504 | | LEAR | 04 06 0140 | S26 W15 | 04 4.9 | | B | DSO | 20 | 4 | 5 | 3 |
| 8504 | | SVTO | 04 06 0610 | S28 W19 | 04 4.8 | | B | CSO | 20 | 7 | 5 | 3 |
| 8504 | | KAND | 04 06 0700 | S29 W19 | 04 4.8 | | | BXO | | 6 | 4 | 3 |
| 8504 | | TACH | 04 06 0730 | S29 W19 | 04 4.8 | | | BRI | 70 | 8 | 2 | 2 |
| 8504 | | RAMY | 04 06 1216 | S28 W20 | 04 4.9 | | B | BXO | 10 | 7 | 4 | 3 |
| 8504 | | HOLL | 04 06 1540 | S28 W22 | 04 4.9 | | B | BXO | 20 | 6 | 3 | 3 |
| 8504 | | LEAR | 04 07 0058 | S26 W27 | 04 4.9 | | B | BXO | 20 | 5 | 5 | 4 |
| 8504 | | SVTO | 04 07 0711 | S28 W32 | 04 4.8 | | B | BXO | 10 | 3 | 3 | 3 |
| 8504 | | RAMY | 04 07 1228 | S28 W34 | 04 4.9 | | B | BXO | | 2 | 4 | 3 |
| 8507 | | LEAR | 04 03 0610 | N09 E66 | 04 8.2 | | B | DSO | 70 | 3 | 7 | 2 |
| 8507 | | SVTO | 04 03 0740 | N12 E65 | 04 8.2 | | B | BXO | 20 | 3 | 6 | 2 |
| 8507 | | KAND | 04 03 1035 | N11 E62 | 04 8.1 | | | BXO | | 3 | 4 | 2 |
| 8507 | | RAMY | 04 03 1246 | N12 E64 | 04 8.3 | | B | BXO | 10 | 6 | 5 | 3 |
| 8507 | | HOLL | 04 03 1635 | N13 E62 | 04 8.4 | | B | BXO | 20 | 6 | 4 | 3 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

### APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8507 | | LEAR | 04 04 0045 | N09 E56 | 04 8.2 | | B | BXO | 10 | 3 | 4 | 3 |
| 8507 | | SVTO | 04 04 0650 | N10 E53 | 04 8.3 | | B | BXO | 20 | 5 | 7 | 3 |
| 8507 | | RAMY | 04 04 1215 | N13 E51 | 04 8.3 | | B | BXO | 30 | 9 | 8 | 4 |
| 8507 | 29047 | MWIL | 04 04 1500 | N12 E49 | 04 8.3 | 4 | (B ) | | | | | |
| 8507 | | HOLL | 04 04 1504 | N12 E50 | 04 8.4 | | B | CSO | 40 | 7 | 9 | 3 |
| 8507 | | LEAR | 04 05 0057 | N09 E44 | 04 8.3 | | B | CSO | 30 | 11 | 8 | 4 |
| 8507 | | SVTO | 04 05 0548 | N12 E42 | 04 8.4 | | BG | DAI | 80 | 11 | 9 | 3 |
| 8507 | | KAND | 04 05 0745 | N12 E38 | 04 8.2 | | | BXO | | 8 | 6 | 3 |
| 8507 | 29047 | MWIL | 04 05 1500 | N12 E36 | 04 8.3 | 4 | (BP) | | | | | |
| 8507 | | LEAR | 04 06 0140 | N11 E30 | 04 8.3 | | B | CSO | 30 | 7 | 7 | 3 |
| 8507 | | SVTO | 04 06 0610 | N12 E27 | 04 8.3 | | B | CAO | 30 | 8 | 7 | 3 |
| 8507 | | KAND | 04 06 0700 | N12 E25 | 04 8.2 | | | CAO | | 6 | 7 | 3 |
| 8507 | | TACH | 04 06 0730 | N11 E24 | 04 8.1 | | | CAI | 120 | 8 | 4 | 2 |
| 8507 | | RAMY | 04 06 1216 | N12 E22 | 04 8.2 | | B | BXO | 20 | 14 | 6 | 3 |
| 8507 | | HOLL | 04 06 1540 | N12 E22 | 04 8.3 | | B | DAO | 40 | 14 | 9 | 3 |
| 8507 | | LEAR | 04 07 0058 | N12 E18 | 04 8.4 | | B | DAO | 90 | 14 | 9 | 4 |
| 8507 | | SVTO | 04 07 0711 | N11 E13 | 04 8.3 | | B | DAI | 100 | 13 | 7 | 3 |
| 8507 | | KAND | 04 07 0750 | N12 E11 | 04 8.1 | | | DAC | | 7 | 6 | 2 |
| 8507 | | RAMY | 04 07 1228 | N11 E09 | 04 8.2 | | B | DAO | 60 | 14 | 6 | 3 |
| 8507 | | LEAR | 04 08 0045 | N12 E04 | 04 8.3 | | B | DAO | 80 | 15 | 7 | 4 |
| 8507 | | TACH | 04 08 0455 | N11 W01 | 04 8.1 | | | DAO | 162 | 4 | 5 | 3 |
| 8507 | | SVTO | 04 08 0650 | N11 W02 | 04 8.1 | | B | DAO | 60 | 13 | 6 | 3 |
| 8507 | | KAND | 04 08 0730 | N12 W01 | 04 8.2 | | | DSO | | 8 | 7 | 4 |
| 8507 | | RAMY | 04 08 1602 | N11 W07 | 04 8.1 | | B | DSO | 60 | 8 | 7 | 3 |
| 8507 | | HOLL | 04 08 1657 | N12 W07 | 04 8.2 | | B | ESO | 80 | 6 | 7 | 3 |
| 8507 | | LEAR | 04 09 0110 | N11 W12 | 04 8.1 | | B | DAO | 80 | 7 | 7 | 3 |
| 8507 | | KAND | 04 09 0620 | N11 W15 | 04 8.1 | | | DAO | | 5 | 7 | 5 |
| 8507 | | RAMY | 04 09 1310 | N10 W18 | 04 8.2 | | B | DAO | 40 | 5 | 7 | 3 |
| 8507 | | HOLL | 04 09 1623 | N11 W18 | 04 8.3 | | B | DSO | 40 | 4 | 7 | 3 |
| 8507 | 29047 | MWIL | 04 09 2300 | N11 W23 | 04 8.2 | 4 | (B ) | | | | | |
| 8507 | | LEAR | 04 10 0012 | N12 W24 | 04 8.2 | | B | DSO | 50 | 6 | 7 | 4 |
| 8507 | | SVTO | 04 10 0547 | N12 W28 | 04 8.1 | | B | DRO | 10 | 5 | 7 | 3 |
| 8507 | | KAND | 04 10 0825 | N11 W30 | 04 8.1 | | | BXO | | 5 | 8 | 4 |
| 8507 | | RAMY | 04 10 1222 | N10 W31 | 04 8.2 | | B | BXO | 10 | 5 | 7 | 4 |
| 8507 | 29047 | MWIL | 04 10 1445 | N11 W33 | 04 8.1 | 4 | (B ) | | | | | |
| 8507 | | HOLL | 04 10 1550 | N11 W33 | 04 8.2 | | B | BXO | 20 | 6 | 7 | 3 |
| 8507 | | LEAR | 04 11 0014 | N12 W35 | 04 8.4 | | B | BXO | 20 | 3 | 3 | 3 |
| 8507 | | SVTO | 04 11 0710 | N11 W39 | 04 8.4 | | B | CRO | 10 | 4 | 4 | 3 |
| 8507 | | TACH | 04 11 0738 | N13 W38 | 04 8.4 | | | AXX | 5 | 1 | 1 | 3 |
| 8507 | | KAND | 04 11 1200 | N10 W42 | 04 8.3 | | | AX | | 1 | 1 | 3 |
| 8507 | | RAMY | 04 11 1354 | N10 W45 | 04 8.2 | | B | BXO | 10 | 4 | 6 | 4 |
| 8504A | 29051 | MWIL | 04 05 1500 | N41 E32 | 04 8.2 | 3 | (AF) | | | | | |
| 8507A | | RAMY | 04 07 1228 | N18 E17 | 04 8.8 | | A | AX | | 2 | | 3 |
| 8505A | | TACH | 04 13 0447 | S21 W45 | 04 9.7 | | | CSO | 45 | 3 | 3 | 3 |
| 8507B | | SVTO | 04 04 0650 | N10 E70 | 04 9.5 | | B | BXO | 10 | 2 | 2 | 3 |
| 8507B | | RAMY | 04 04 1215 | N12 E69 | 04 9.7 | | A | AX | | 1 | | 4 |
| 8507B | | LEAR | 04 05 0057 | N09 E62 | 04 9.7 | | A | AX | | 1 | | 4 |
| 8507B | | SVTO | 04 05 0548 | N13 E61 | 04 9.8 | | A | AX | 10 | 1 | 1 | 3 |
| 8507B | | KAND | 04 05 0745 | N12 E60 | 04 9.8 | | | AX | | 1 | | 3 |
| 8508 | | RAMY | 04 03 1246 | N18 E85 | 04 10.0 | | B | DSO | 50 | 2 | 6 | 3 |
| 8508 | | HOLL | 04 03 1635 | N20 E78 | 04 9.6 | | A | HS | 40 | 3 | 2 | 3 |
| 8508 | | LEAR | 04 04 0045 | N17 E75 | 04 9.7 | | A | HA | 60 | 3 | 3 | 3 |
| 8508 | | SVTO | 04 04 0650 | N20 E70 | 04 9.6 | | B | DAO | 90 | 7 | 9 | 3 |
| 8508 | | RAMY | 04 04 1215 | N22 E70 | 04 9.9 | | B | DAO | 110 | 5 | 8 | 4 |
| 8508 | 29048 | MWIL | 04 04 1500 | N19 E66 | 04 9.7 | 4 | (AP) | | | | | |
| 8508 | 29049 | MWIL | 04 04 1500 | N24 E71 | 04 10.1 | 4 | (AP) | | | | | |
| 8508 | | HOLL | 04 04 1504 | N22 E68 | 04 9.8 | | B | CSO | 80 | 5 | 8 | 3 |
| 8508 | | LEAR | 04 05 0057 | N18 E60 | 04 9.6 | | B | CAO | 90 | 9 | 11 | 4 |
| 8508 | | SVTO | 04 05 0548 | N21 E58 | 04 9.7 | | BG | FAO | 320 | 12 | 12 | 3 |
| 8508 | | KAND | 04 05 0745 | N20 E59 | 04 9.8 | | | CAO | | 10 | 9 | 3 |
| 8508 | 29048 | MWIL | 04 05 1500 | N20 E53 | 04 9.7 | 5 | (BG) | | | | | |
| 8508 | | LEAR | 04 06 0140 | N19 E48 | 04 9.7 | | BG | DAO | 100 | 8 | 7 | 3 |
| 8508 | | SVTO | 04 06 0610 | N21 E45 | 04 9.7 | | BG | EAO | 150 | 14 | 12 | 3 |
| 8508 | | KAND | 04 06 0700 | N21 E44 | 04 9.7 | | | DAI | | 13 | 6 | 3 |

# S U N S P O T  G R O U P S
(Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8508 | | TACH | 04 06 0730 | N20 E44 | 04 9.7 | | | CAI | 197 | 15 | 4 | 2 |
| 8508 | | RAMY | 04 06 1216 | N23 E42 | 04 9.7 | | BG | ESO | 80 | 17 | 11 | 3 |
| 8508 | | HOLL | 04 06 1540 | N21 E41 | 04 9.8 | | B | EAO | 110 | 18 | 12 | 3 |
| 8508 | | LEAR | 04 07 0058 | N21 E40 | 04 10.1 | | BG | DAO | 90 | 17 | 7 | 4 |
| 8508 | | SVTO | 04 07 0711 | N22 E33 | 04 9.8 | | BG | EAI | 130 | 22 | 12 | 3 |
| 8508 | | KAND | 04 07 0750 | N23 E32 | 04 9.8 | | | DAO | | 11 | 7 | 2 |
| 8508 | | RAMY | 04 07 1228 | N23 E30 | 04 9.8 | | BGD | DAI | 160 | 24 | 10 | 3 |
| 8508 | | LEAR | 04 08 0045 | N21 E25 | 04 9.9 | | BG | DAI | 180 | 43 | 9 | 4 |
| 8508 | | TACH | 04 08 0455 | N21 E21 | 04 9.8 | | | DAI | 382 | 16 | 4 | 3 |
| 8508 | | SVTO | 04 08 0650 | N22 E21 | 04 9.9 | | BG | FAI | 150 | 37 | 18 | 3 |
| 8508 | | KAND | 04 08 0730 | N22 E20 | 04 9.8 | | | DAC | | 20 | 8 | 4 |
| 8508 | | RAMY | 04 08 1602 | N22 E14 | 04 9.7 | | B | DAI | 200 | 40 | 9 | 3 |
| 8508 | | HOLL | 04 08 1657 | N22 E14 | 04 9.8 | | B | DAO | 230 | 35 | 9 | 3 |
| 8508 | | LEAR | 04 09 0110 | N22 E10 | 04 9.8 | | BG | DAI | 170 | 39 | 10 | 3 |
| 8508 | | KAND | 04 09 0620 | N21 E06 | 04 9.7 | | | DAO | | 25 | 10 | 5 |
| 8508 | | RAMY | 04 09 1310 | N25 E03 | 04 9.8 | | B | DAI | 160 | 28 | 10 | 3 |
| 8508 | | HOLL | 04 09 1623 | N22 E03 | 04 9.9 | | B | DAC | 110 | 32 | 10 | 3 |
| 8508 | 29048 | MWIL | 04 09 2300 | N21 W01 | 04 9.9 | 5 | (BG) | | | | | |
| 8508 | | LEAR | 04 10 0012 | N22 W02 | 04 9.8 | | BG | DAI | 150 | 44 | 10 | 4 |
| 8508 | | SVTO | 04 10 0547 | N22 W06 | 04 9.8 | | B | EAI | 210 | 34 | 13 | 3 |
| 8508 | | KAND | 04 10 0825 | N22 W08 | 04 9.7 | | | DAI | | 22 | 9 | 4 |
| 8508 | | RAMY | 04 10 1222 | N21 W10 | 04 9.7 | | BG | DAI | 230 | 34 | 10 | 4 |
| 8508 | 29048 | MWIL | 04 10 1445 | N21 W10 | 04 9.8 | 5 | (G ) | | | | | |
| 8508 | | HOLL | 04 10 1550 | N22 W12 | 04 9.7 | | B | EAC | 160 | 29 | 11 | 3 |
| 8508 | | LEAR | 04 11 0014 | N22 W15 | 04 9.8 | | BG | EAI | 140 | 31 | 11 | 3 |
| 8508 | | SVTO | 04 11 0710 | N21 W19 | 04 9.8 | | B | ESI | 130 | 21 | 11 | 3 |
| 8508 | | TACH | 04 11 0738 | N22 W19 | 04 9.8 | | | DAI | 209 | 12 | 10 | 3 |
| 8508 | | KAND | 04 11 1200 | N21 W21 | 04 9.9 | | | EAI | | 17 | 12 | 3 |
| 8508 | | RAMY | 04 11 1354 | N20 W24 | 04 9.7 | | B | EAO | 100 | 24 | 11 | 4 |
| 8508 | | LEAR | 04 12 0010 | N18 W40 | 04 9.0 | | B | BXO | 10 | 2 | 2 | 3 |
| 8508 | | LEAR | 04 12 0010 | N22 W29 | 04 9.8 | | BG | EAO | 100 | 17 | 11 | 3 |
| 8508 | | TACH | 04 12 0605 | N22 W29 | 04 10.0 | | | BRO | 65 | 4 | 6 | 3 |
| 8508 | | SVTO | 04 12 0608 | N22 W32 | 04 9.8 | | B | CSI | 50 | 9 | 13 | 2 |
| 8508 | | KAND | 04 12 0745 | N21 W31 | 04 9.9 | | | BXO | | 19 | 11 | 4 |
| 8508 | | RAMY | 04 12 1305 | N20 W38 | 04 9.6 | | B | CSO | 20 | 10 | 6 | 2 |
| 8508 | | HOLL | 04 12 1546 | N23 W36 | 04 9.9 | | B | DSO | 60 | 13 | 10 | 3 |
| 8508 | | LEAR | 04 13 0015 | N21 W43 | 04 9.7 | | B | CSO | 50 | 8 | 7 | 4 |
| 8508 | | KAND | 04 13 0810 | N21 W49 | 04 9.6 | | | CRO | | 3 | 6 | 4 |
| 8508 | | RAMY | 04 13 1219 | N22 W48 | 04 9.8 | | B | BXO | 10 | 3 | 7 | 3 |
| 8508 | | HOLL | 04 13 1520 | N21 W54 | 04 9.5 | | A | AX | | 1 | | 1 |
| 8508 | 29048 | MWIL | 04 13 1600 | N22 W51 | 04 9.7 | 4 | (AP) | | | | | |
| 8508A | | HOLL | 04 04 1504 | N22 E69 | 04 9.9 | | A | AX | 10 | 1 | 1 | 3 |
| 8509 | | RAMY | 04 09 1310 | N15 E11 | 04 10.4 | | B | BXO | 10 | 3 | 3 | 3 |
| 8509 | | HOLL | 04 09 1623 | N15 E10 | 04 10.4 | | B | BXO | 10 | 3 | 3 | 3 |
| 8509 | | RAMY | 04 12 1305 | N13 W26 | 04 10.6 | | A | AX | | 1 | | 2 |
| 8509 | | HOLL | 04 12 1546 | N14 W26 | 04 10.7 | | B | BXO | 10 | 2 | 3 | 3 |
| 8509 | | LEAR | 04 13 0015 | N13 W32 | 04 10.6 | | B | BXO | 10 | 4 | 4 | 4 |
| 8509 | | TACH | 04 13 0447 | N14 W33 | 04 10.7 | | | AR | 3 | 2 | 2 | 3 |
| 8509 | | RAMY | 04 13 1219 | N13 W38 | 04 10.6 | | A | AX | | 1 | | 3 |
| 8510 | | LEAR | 04 06 0140 | S35 E65 | 04 11.3 | | A | AX | | 1 | 1 | 3 |
| 8510 | | SVTO | 04 06 0610 | S34 E59 | 04 10.9 | | A | HS | 20 | 1 | 1 | 3 |
| 8510 | | KAND | 04 06 0700 | S33 E60 | 04 11.0 | | | AX | | 1 | 1 | 3 |
| 8510 | | RAMY | 04 06 1216 | S33 E57 | 04 11.0 | | B | BXO | | 2 | 3 | 3 |
| 8510 | | HOLL | 04 06 1540 | S34 E59 | 04 11.3 | | B | CAO | 40 | 3 | 8 | 3 |
| 8510 | | LEAR | 04 07 0058 | S35 E53 | 04 11.3 | | B | BXO | 20 | 3 | 8 | 4 |
| 8510 | | SVTO | 04 07 0711 | S34 E47 | 04 11.0 | | A | HR | 10 | 1 | 1 | 3 |
| 8510 | | KAND | 04 07 0750 | S32 E46 | 04 11.0 | | | HS | | 1 | 1 | 2 |
| 8510 | | RAMY | 04 07 1228 | S33 E43 | 04 10.9 | | A | AX | | 1 | | 3 |
| 8510 | | LEAR | 04 08 0045 | S35 E36 | 04 10.9 | | A | AX | | 1 | 1 | 4 |
| 8510 | | TACH | 04 08 0455 | S34 E33 | 04 10.8 | | | AXX | 15 | 1 | 1 | 3 |
| 8510 | | SVTO | 04 08 0650 | S34 E32 | 04 10.8 | | A | HR | 10 | 1 | 1 | 3 |
| 8510 | | KAND | 04 08 0730 | S33 E34 | 04 11.0 | | | BXO | | 2 | 3 | 4 |
| 8510 | | RAMY | 04 08 1602 | S34 E28 | 04 10.9 | | A | AX | | 1 | | 3 |
| 8510 | | HOLL | 04 08 1657 | S35 E27 | 04 10.9 | | A | AX | 10 | 1 | | 3 |
| 8510 | | LEAR | 04 09 0110 | S35 E21 | 04 10.7 | | B | BXO | 10 | 2 | 3 | 3 |
| 8510 | | KAND | 04 09 0620 | S34 E21 | 04 10.9 | | | AX | | 1 | 1 | 5 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Mo | Day | Time (UT) | Lat | CMP | Mo | Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8510 | | HOLL | 04 | 09 | 1623 | S35 | E16 | 04 | 11.0 | | A | AX | | 1 | | 3 |
| 8511 | 29052 | MWIL | 04 | 05 | 1500 | S17 | E76 | 04 | 11.4 | 4 | (BP) | | | | | |
| 8511 | | LEAR | 04 | 06 | 0140 | S17 | E71 | 04 | 11.5 | | B | CSO | 50 | 5 | 5 | 3 |
| 8511 | | SVTO | 04 | 06 | 0610 | S17 | E67 | 04 | 11.3 | | B | DAO | 140 | 5 | 6 | 3 |
| 8511 | | KAND | 04 | 06 | 0700 | S16 | E68 | 04 | 11.4 | | | CAO | | 5 | 6 | 3 |
| 8511 | | TACH | 04 | 06 | 0730 | S17 | E68 | 04 | 11.5 | | | DAI | 120 | 5 | 3 | 2 |
| 8511 | | RAMY | 04 | 06 | 1216 | S15 | E64 | 04 | 11.3 | | B | DAO | 80 | 7 | 5 | 3 |
| 8511 | | HOLL | 04 | 06 | 1540 | S17 | E63 | 04 | 11.4 | | B | DAO | 120 | 5 | 6 | 3 |
| 8511 | | LEAR | 04 | 07 | 0058 | S17 | E57 | 04 | 11.4 | | B | DAO | 140 | 2 | 6 | 4 |
| 8511 | | SVTO | 04 | 07 | 0711 | S17 | E55 | 04 | 11.5 | | B | DAO | 150 | 8 | 7 | 3 |
| 8511 | | KAND | 04 | 07 | 0750 | S16 | E55 | 04 | 11.5 | | | DAO | | 2 | 8 | 2 |
| 8511 | | RAMY | 04 | 07 | 1228 | S16 | E52 | 04 | 11.5 | | B | DAO | 100 | 6 | 8 | 3 |
| 8511 | | LEAR | 04 | 08 | 0045 | S17 | E45 | 04 | 11.4 | | B | DAO | 140 | 5 | 7 | 4 |
| 8511 | | TACH | 04 | 08 | 0455 | S17 | E43 | 04 | 11.5 | | | DSO | 210 | 2 | 6 | 3 |
| 8511 | | SVTO | 04 | 08 | 0650 | S17 | E42 | 04 | 11.5 | | B | DAO | 70 | 4 | 8 | 3 |
| 8511 | | KAND | 04 | 08 | 0730 | S16 | E42 | 04 | 11.5 | | | DSO | | 5 | 8 | 4 |
| 8511 | | RAMY | 04 | 08 | 1602 | S16 | E37 | 04 | 11.5 | | B | DSO | 100 | 6 | 7 | 3 |
| 8511 | | HOLL | 04 | 08 | 1657 | S17 | E37 | 04 | 11.5 | | B | DSO | 100 | 7 | 7 | 3 |
| 8511 | | LEAR | 04 | 09 | 0110 | S17 | E32 | 04 | 11.5 | | B | DSO | 140 | 6 | 7 | 3 |
| 8511 | | KAND | 04 | 09 | 0620 | S16 | E30 | 04 | 11.5 | | | DSO | | 6 | 8 | 5 |
| 8511 | | RAMY | 04 | 09 | 1310 | S16 | E26 | 04 | 11.5 | | B | DSO | 70 | 3 | 7 | 3 |
| 8511 | | HOLL | 04 | 09 | 1623 | S17 | E25 | 04 | 11.6 | | B | DSO | 100 | 4 | 7 | 3 |
| 8511 | 29052 | MWIL | 04 | 09 | 2300 | S16 | E21 | 04 | 11.5 | 5 | (B ) | | | | | |
| 8511 | | LEAR | 04 | 10 | 0012 | S17 | E19 | 04 | 11.4 | | B | DSO | 120 | 7 | 7 | 4 |
| 8511 | | SVTO | 04 | 10 | 0547 | S16 | E17 | 04 | 11.5 | | B | DAO | 120 | 8 | 9 | 3 |
| 8511 | | KAND | 04 | 10 | 0825 | S16 | E16 | 04 | 11.6 | | | DAO | | 6 | 8 | 4 |
| 8511 | | RAMY | 04 | 10 | 1222 | S16 | E14 | 04 | 11.6 | | B | DAO | 100 | 4 | 7 | 4 |
| 8511 | 29052 | MWIL | 04 | 10 | 1445 | S16 | E13 | 04 | 11.6 | 4 | (BG) | | | | | |
| 8511 | | HOLL | 04 | 10 | 1550 | S17 | E12 | 04 | 11.6 | | B | DSO | 100 | 5 | 8 | 3 |
| 8511 | | LEAR | 04 | 11 | 0014 | S17 | E07 | 04 | 11.5 | | B | DSO | 110 | 4 | 8 | 3 |
| 8511 | | SVTO | 04 | 11 | 0710 | S16 | E04 | 04 | 11.6 | | B | DAO | 90 | 4 | 9 | 3 |
| 8511 | | TACH | 04 | 11 | 0738 | S15 | E03 | 04 | 11.5 | | | DAO | 180 | 3 | 6 | 3 |
| 8511 | | KAND | 04 | 11 | 1200 | S16 | E01 | 04 | 11.6 | | | DAO | | 4 | 9 | 3 |
| 8511 | | RAMY | 04 | 11 | 1354 | S17 | E01 | 04 | 11.6 | | B | DAO | 140 | 4 | 8 | 4 |
| 8511 | | LEAR | 04 | 12 | 0010 | S16 | W06 | 04 | 11.5 | | B | DAO | 90 | 5 | 8 | 3 |
| 8511 | | TACH | 04 | 12 | 0605 | S15 | W09 | 04 | 11.6 | | | CAO | 115 | 3 | 6 | 3 |
| 8511 | | SVTO | 04 | 12 | 0608 | S16 | W10 | 04 | 11.5 | | B | DSO | 80 | 7 | 8 | 2 |
| 8511 | | KAND | 04 | 12 | 0745 | S16 | W10 | 04 | 11.6 | | | CAO | | 8 | 8 | 4 |
| 8511 | | RAMY | 04 | 12 | 1305 | S16 | W13 | 04 | 11.5 | | B | CSO | 60 | 5 | 8 | 2 |
| 8511 | | HOLL | 04 | 12 | 1546 | S16 | W15 | 04 | 11.5 | | B | DSO | 80 | 4 | 8 | 3 |
| 8511 | | TACH | 04 | 13 | 0447 | S15 | W22 | 04 | 11.5 | | | CAO | 78 | 3 | 6 | 3 |
| 8511 | | KAND | 04 | 13 | 0810 | S16 | W24 | 04 | 11.5 | | | CAO | | 6 | 8 | 4 |
| 8511 | | RAMY | 04 | 13 | 1219 | S16 | W26 | 04 | 11.5 | | B | CSO | 20 | 3 | 8 | 3 |
| 8511 | | HOLL | 04 | 13 | 1520 | S17 | W31 | 04 | 11.3 | | A | HS | 20 | 3 | 2 | 1 |
| 8511 | 29052 | MWIL | 04 | 13 | 1600 | S16 | W31 | 04 | 11.3 | 5 | (AP) | | | | | |
| 8511 | | KAND | 04 | 14 | 1330 | S16 | W42 | 04 | 11.4 | | | HS | | 1 | 1 | 3 |
| 8511 | 29052 | MWIL | 04 | 14 | 1545 | S16 | W43 | 04 | 11.4 | 5 | (AP) | | | | | |
| 8511 | | KAND | 04 | 15 | 0630 | S16 | W52 | 04 | 11.3 | | | AX | | 1 | | 4 |
| 8511 | 29052 | MWIL | 04 | 15 | 1430 | S15 | W57 | 04 | 11.3 | 3 | (AP) | | | | | |
| 8510A | | TACH | 04 | 06 | 0730 | S36 | E67 | 04 | 11.7 | | | AR | 12 | 2 | 2 | 2 |
| 8512A | | HOLL | 04 | 06 | 1540 | S27 | E73 | 04 | 12.3 | | A | AX | | 1 | | 3 |
| 8512B | 29063 | MWIL | 04 | 18 | 1445 | N18 | W79 | 04 | 12.6 | 3 | (AF) | | | | | |
| 8512 | | SVTO | 04 | 08 | 0650 | S27 | E61 | 04 | 13.0 | | A | AX | | 1 | | 3 |
| 8512 | | KAND | 04 | 08 | 0730 | S26 | E62 | 04 | 13.1 | | | BXO | | 3 | 5 | 4 |
| 8512 | | RAMY | 04 | 08 | 1602 | S27 | E56 | 04 | 13.0 | | B | BXO | 10 | 3 | 4 | 3 |
| 8512 | | HOLL | 04 | 08 | 1657 | S28 | E55 | 04 | 13.0 | | B | BXO | 20 | 6 | 5 | 3 |
| 8512 | | LEAR | 04 | 09 | 0110 | S28 | E48 | 04 | 12.8 | | B | CAO | 50 | 9 | 4 | 3 |
| 8512 | | KAND | 04 | 09 | 0620 | S27 | E48 | 04 | 13.0 | | | BXO | | 11 | 5 | 5 |
| 8512 | | RAMY | 04 | 09 | 1310 | S27 | E45 | 04 | 13.0 | | B | DAO | 80 | 2 | 4 | 3 |
| 8512 | | HOLL | 04 | 09 | 1623 | S28 | E43 | 04 | 13.0 | | B | DSO | 50 | 6 | 5 | 3 |
| 8512 | 29053 | MWIL | 04 | 09 | 2300 | S27 | E40 | 04 | 13.1 | 4 | (B ) | | | | | |
| 8512 | | LEAR | 04 | 10 | 0012 | S28 | E37 | 04 | 12.9 | | B | DAO | 60 | 8 | 6 | 4 |
| 8512 | | SVTO | 04 | 10 | 0547 | S27 | E35 | 04 | 13.0 | | B | DAO | 90 | 7 | 6 | 3 |
| 8512 | | KAND | 04 | 10 | 0825 | S27 | E34 | 04 | 13.0 | | | CSO | | 6 | 7 | 4 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8512 | | RAMY | 04 10 1222 | S26 E32 | 04 13.0 | | B | DAO | 50 | 8 | 6 | 4 |
| 8512 | 29053 | MWIL | 04 10 1445 | S27 E30 | 04 12.9 | 5 | (B ) | | | | | |
| 8512 | | HOLL | 04 10 1550 | S28 E30 | 04 13.0 | | B | DSO | 40 | 4 | 5 | 3 |
| 8512 | | LEAR | 04 11 0014 | S28 E23 | 04 12.8 | | B | DAO | 40 | 10 | 6 | 3 |
| 8512 | | SVTO | 04 11 0710 | S27 E21 | 04 12.9 | | B | DSO | 30 | 6 | 5 | 3 |
| 8512 | | TACH | 04 11 0738 | S26 E20 | 04 12.9 | | | BSO | 60 | 3 | 6 | 3 |
| 8512 | | KAND | 04 11 1200 | S28 E18 | 04 12.9 | | | CAO | | 3 | 6 | 3 |
| 8512 | | RAMY | 04 11 1354 | S27 E18 | 04 13.0 | | B | DAO | 60 | 4 | 7 | 4 |
| 8512 | | LEAR | 04 12 0010 | S28 E11 | 04 12.9 | | B | DSO | 40 | 7 | 6 | 3 |
| 8512 | | TACH | 04 12 0605 | S29 E11 | 04 13.1 | | | BSI | 46 | 5 | 11 | 3 |
| 8512 | | SVTO | 04 12 0608 | S28 E08 | 04 12.9 | | B | CSO | 20 | 3 | 6 | 2 |
| 8512 | | KAND | 04 12 0745 | S28 E09 | 04 13.0 | | | BXO | | 7 | 7 | 4 |
| 8512 | | RAMY | 04 12 1305 | S27 E05 | 04 12.9 | | B | CRO | 10 | 4 | 6 | 2 |
| 8512 | | HOLL | 04 12 1546 | S27 E02 | 04 12.8 | | B | CSO | 30 | 5 | 6 | 3 |
| 8512 | | LEAR | 04 13 0015 | S27 W05 | 04 12.6 | | B | CSO | 30 | 6 | 3 | 4 |
| 8512 | | TACH | 04 13 0447 | S23 W14 | 04 12.1 | | | AR | 27 | 4 | 3 | 3 |
| 8512 | | KAND | 04 13 0810 | S27 W08 | 04 12.7 | | | DSO | | 3 | 4 | 4 |
| 8512 | | RAMY | 04 13 1219 | S27 W10 | 04 12.7 | | B | CSO | 20 | 6 | 5 | 3 |
| 8512 | | HOLL | 04 13 1520 | S27 W12 | 04 12.7 | | B | CSO | 30 | 7 | 4 | 1 |
| 8512 | 29053 | MWIL | 04 13 1600 | S27 W12 | 04 12.7 | 5 | (BP) | | | | | |
| 8512 | | KAND | 04 14 1330 | S27 W24 | 04 12.7 | | | CAO | | 2 | 4 | 3 |
| 8512 | 29053 | MWIL | 04 14 1545 | S27 W25 | 04 12.7 | 4 | (AP) | | | | | |
| 8512 | | TACH | 04 15 0610 | S28 W28 | 04 13.1 | | | CSO | 82 | 4 | 11 | 3 |
| 8512 | | KAND | 04 15 0630 | S27 W32 | 04 12.8 | | | CAO | | 3 | 4 | 4 |
| 8512 | 29053 | MWIL | 04 15 1430 | S28 W37 | 04 12.7 | 4 | (AP) | | | | | |
| 8512 | | TACH | 04 16 0530 | S27 W43 | 04 12.9 | | | BRO | 40 | 3 | 9 | 2 |
| 8512 | | KAND | 04 16 0700 | S28 W49 | 04 12.5 | | | HR | | 1 | 1 | 3 |
| 8512 | | RAMY | 04 16 1155 | S27 W51 | 04 12.5 | | A | AX | 10 | 1 | 1 | 3 |
| 8512 | 29053 | MWIL | 04 16 1700 | S27 W55 | 04 12.4 | 4 | (AP) | | | | | |
| 8512 | | HOLL | 04 16 1846 | S28 W51 | 04 12.8 | | A | AX | 20 | 1 | 1 | 2 |
| 8512 | | SVTO | 04 17 0722 | S22 W60 | 04 12.7 | | A | AX | | 1 | | 3 |
| 8512 | | HOLL | 04 17 1440 | S27 W65 | 04 12.5 | | A | HS | 20 | 1 | 1 | 3 |
| 8512 | 29053 | MWIL | 04 17 1500 | S27 W65 | 04 12.6 | 4 | (BP) | | | | | |
| 8512 | | LEAR | 04 18 0120 | S26 W70 | 04 12.6 | | A | AX | | 1 | | 3 |
| 8512 | | TACH | 04 18 0345 | S26 W72 | 04 12.6 | | | AXX | 1 | 1 | 1 | 3 |
| 8512 | | SVTO | 04 18 0718 | S27 W73 | 04 12.6 | | A | AX | 10 | 1 | | 3 |
| 8512 | | KAND | 04 18 1020 | S27 W76 | 04 12.5 | | | AX | | 1 | 1 | 2 |
| 8512 | | RAMY | 04 18 1216 | S28 W76 | 04 12.6 | | A | AX | | 1 | | 3 |
| 8512 | 29053 | MWIL | 04 18 1445 | S27 W78 | 04 12.5 | 3 | (AP) | | | | | |
| 8512 | | HOLL | 04 18 1535 | S28 W79 | 04 12.5 | | B | BXO | 10 | 2 | 5 | 3 |
| 8514A | | TACH | 04 13 0447 | S29 W03 | 04 13.0 | | | CAI | 114 | 7 | 6 | 3 |
| 8513A | | RAMY | 04 08 1602 | S17 E63 | 04 13.4 | | A | AX | | 1 | | 3 |
| 8514 | | SVTO | 04 12 0608 | S33 E18 | 04 13.7 | | B | BXO | 10 | 5 | 9 | 2 |
| 8514 | | KAND | 04 12 0745 | S33 E17 | 04 13.7 | | | BXO | | 13 | 4 | 4 |
| 8514 | | RAMY | 04 12 1305 | S33 E14 | 04 13.6 | | B | BXO | 20 | 12 | 6 | 2 |
| 8514 | | HOLL | 04 12 1546 | S34 E11 | 04 13.5 | | B | DRO | 40 | 11 | 4 | 3 |
| 8514 | | LEAR | 04 13 0015 | S33 E07 | 04 13.6 | | B | DAO | 50 | 12 | 5 | 4 |
| 8514 | | KAND | 04 13 0810 | S33 E04 | 04 13.6 | | | CAO | | 8 | 5 | 4 |
| 8514 | | RAMY | 04 13 1219 | S33 E01 | 04 13.6 | | B | CAO | 30 | 10 | 8 | 3 |
| 8514 | | HOLL | 04 13 1520 | S34 W02 | 04 13.5 | | B | CSO | 40 | 8 | 6 | 1 |
| 8514 | 29055 | MWIL | 04 13 1600 | S34 W01 | 04 13.6 | 4 | (B ) | | | | | |
| 8514 | | KAND | 04 14 1330 | S34 W13 | 04 13.5 | | | CAO | | 5 | 6 | 3 |
| 8514 | 29055 | MWIL | 04 14 1545 | S34 W13 | 04 13.6 | 4 | (B ) | | | | | |
| 8514 | | KAND | 04 15 0630 | S33 W21 | 04 13.6 | | | BXO | | 4 | 7 | 4 |
| 8514 | 29055 | MWIL | 04 15 1430 | S33 W27 | 04 13.4 | 5 | (B ) | | | | | |
| 8514 | | KAND | 04 16 0700 | S33 W35 | 04 13.5 | | | CAO | | 6 | 11 | 3 |
| 8514 | | RAMY | 04 16 1155 | S32 W43 | 04 13.1 | | B | BXO | 10 | 2 | | 3 |
| 8514 | 29055 | MWIL | 04 16 1700 | S32 W42 | 04 13.4 | 4 | (B ) | | | | | |
| 8514 | | HOLL | 04 16 1846 | S33 W42 | 04 13.4 | | B | CSO | 30 | 3 | 3 | 2 |
| 8514 | | SVTO | 04 17 0722 | S28 W50 | 04 13.4 | | B | BXO | 20 | 5 | 8 | 3 |
| 8514 | | HOLL | 04 17 1440 | S33 W52 | 04 13.5 | | B | EAO | 80 | 9 | 11 | 3 |
| 8514 | 29055 | MWIL | 04 17 1500 | S32 W52 | 04 13.5 | 4 | (B ) | | | | | |
| 8514 | | LEAR | 04 18 0120 | S31 W59 | 04 13.4 | | B | EAO | 50 | 8 | 11 | 3 |
| 8514 | | TACH | 04 18 0345 | S31 W58 | 04 13.6 | | | BSO | 2 | 2 | 7 | 3 |
| 8514 | | SVTO | 04 18 0718 | S34 W61 | 04 13.4 | | B | BXO | 20 | 4 | 11 | 3 |
| 8514 | | KAND | 04 18 1020 | S32 W60 | 04 13.7 | | | CRO | | 3 | 10 | 2 |

# SUNSPOT GROUPS
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Mo | Day | Time (UT) | Lat | CMD | CMP Mo | Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8514 | | RAMY | 04 | 18 | 1216 | S33 | W61 | 04 | 13.7 | | B | BXO | 10 | 3 | 10 | 3 |
| 8514 | 29055 | MWIL | 04 | 18 | 1445 | S33 | W64 | 04 | 13.5 | 4 | (B ) | | | | | |
| 8514 | | HOLL | 04 | 18 | 1535 | S33 | W66 | 04 | 13.4 | | B | BXO | 30 | 7 | 11 | 3 |
| 8514 | | SVTO | 04 | 19 | 0515 | S31 | W75 | 04 | 13.3 | | A | AX | 10 | 1 | | 3 |
| 8513 | | LEAR | 04 | 09 | 0110 | S18 | E63 | 04 | 13.8 | | B | BXO | 10 | 2 | 11 | 3 |
| 8513 | | KAND | 04 | 09 | 0620 | S17 | E56 | 04 | 13.5 | | | AX | | 1 | | 5 |
| 8513 | | RAMY | 04 | 09 | 1310 | S17 | E54 | 04 | 13.6 | | B | BXO | 20 | 2 | 5 | 3 |
| 8513 | | HOLL | 04 | 09 | 1623 | S18 | E52 | 04 | 13.6 | | B | BXO | 20 | 6 | 10 | 3 |
| 8513 | 29054 | MWIL | 04 | 09 | 2300 | S17 | E49 | 04 | 13.7 | 4 | (B ) | | | | | |
| 8513 | | LEAR | 04 | 10 | 0012 | S19 | E47 | 04 | 13.6 | | B | CSO | 70 | 11 | 6 | 4 |
| 8513 | | SVTO | 04 | 10 | 0547 | S18 | E45 | 04 | 13.7 | | B | DAO | 120 | 10 | 7 | 3 |
| 8513 | | KAND | 04 | 10 | 0825 | S18 | E44 | 04 | 13.7 | | | CSO | | 7 | 6 | 4 |
| 8513 | | RAMY | 04 | 10 | 1222 | S17 | E42 | 04 | 13.7 | | B | DAO | 90 | 12 | 7 | 4 |
| 8513 | 29054 | MWIL | 04 | 10 | 1445 | S17 | E40 | 04 | 13.6 | 5 | (B ) | | | | | |
| 8513 | | HOLL | 04 | 10 | 1550 | S20 | E38 | 04 | 13.6 | | B | DAO | 80 | 13 | 6 | 3 |
| 8513 | | LEAR | 04 | 11 | 0014 | S19 | E34 | 04 | 13.6 | | B | CAO | 50 | 17 | 7 | 3 |
| 8513 | | SVTO | 04 | 11 | 0710 | S18 | E30 | 04 | 13.6 | | B | DSO | 70 | 11 | 6 | 3 |
| 8513 | | TACH | 04 | 11 | 0738 | S18 | E30 | 04 | 13.6 | | | CAI | 136 | 7 | 5 | 3 |
| 8513 | | KAND | 04 | 11 | 1200 | S18 | E28 | 04 | 13.6 | | | CAO | | 10 | 8 | 3 |
| 8513 | | RAMY | 04 | 11 | 1354 | S17 | E27 | 04 | 13.6 | | B | DSO | 90 | 14 | 7 | 4 |
| 8513 | | LEAR | 04 | 12 | 0010 | S19 | E21 | 04 | 13.6 | | B | DAO | 60 | 15 | 7 | 3 |
| 8513 | | TACH | 04 | 12 | 0605 | S18 | E19 | 04 | 13.7 | | | DAI | 197 | 7 | 6 | 3 |
| 8513 | | SVTO | 04 | 12 | 0608 | S18 | E18 | 04 | 13.6 | | B | ESI | 70 | 20 | 11 | 2 |
| 8513 | | KAND | 04 | 12 | 0745 | S18 | E18 | 04 | 13.7 | | | DAI | | 20 | 7 | 4 |
| 8513 | | RAMY | 04 | 12 | 1305 | S18 | E14 | 04 | 13.6 | | B | CAO | 40 | 17 | 8 | 2 |
| 8513 | | HOLL | 04 | 12 | 1546 | S18 | E13 | 04 | 13.6 | | B | DAO | 70 | 19 | 8 | 3 |
| 8513 | | LEAR | 04 | 13 | 0015 | S19 | E08 | 04 | 13.6 | | B | DAO | 90 | 15 | 6 | 4 |
| 8513 | | TACH | 04 | 13 | 0447 | S18 | E05 | 04 | 13.6 | | | DAI | 134 | 10 | 5 | 3 |
| 8513 | | KAND | 04 | 13 | 0810 | S18 | E04 | 04 | 13.6 | | | CAO | | 13 | 7 | 4 |
| 8513 | | RAMY | 04 | 13 | 1219 | S18 | E01 | 04 | 13.6 | | B | DAO | 30 | 12 | 9 | 3 |
| 8513 | | HOLL | 04 | 13 | 1520 | S18 | E01 | 04 | 13.7 | | B | DAO | 60 | 10 | 5 | 1 |
| 8513 | 29054 | MWIL | 04 | 13 | 1600 | S18 | E00 | 04 | 13.7 | 4 | (BF) | | | | | |
| 8513 | | KAND | 04 | 14 | 1330 | S18 | W11 | 04 | 13.7 | | | CAO | | 8 | 7 | 3 |
| 8513 | 29054 | MWIL | 04 | 14 | 1545 | S18 | W12 | 04 | 13.7 | 4 | (B ) | | | | | |
| 8513 | | TACH | 04 | 15 | 0610 | S17 | W22 | 04 | 13.6 | | | AR | 27 | 3 | 2 | 3 |
| 8513 | | KAND | 04 | 15 | 0630 | S17 | W23 | 04 | 13.5 | | | BXO | | 3 | 3 | 4 |
| 8513 | 29054 | MWIL | 04 | 15 | 1430 | S17 | W28 | 04 | 13.5 | 5 | (AP) | | | | | |
| 8513 | | TACH | 04 | 16 | 0530 | S15 | W36 | 04 | 13.5 | | | AR | 2 | 2 | 1 | 2 |
| 8513 | | KAND | 04 | 16 | 0700 | S18 | W38 | 04 | 13.4 | | | BXO | | 2 | 2 | 3 |
| 8513 | | HOLL | 04 | 16 | 1846 | S18 | W42 | 04 | 13.6 | | A | AX | 10 | 2 | 1 | 2 |
| 8513B | | RAMY | 04 | 08 | 1602 | S16 | E74 | 04 | 14.3 | | A | AX | | 1 | | 3 |
| 8515 | | KAND | 04 | 09 | 0620 | S16 | E69 | 04 | 14.5 | | | AX | | 1 | | 5 |
| 8515 | | HOLL | 04 | 09 | 1623 | S17 | E63 | 04 | 14.5 | | A | AX | | 1 | | 3 |
| 8515 | | RAMY | 04 | 12 | 1305 | S17 | E24 | 04 | 14.4 | | A | AX | | 2 | 2 | 2 |
| 8515 | | HOLL | 04 | 12 | 1546 | S19 | E23 | 04 | 14.4 | | B | BXO | 10 | 6 | 3 | 3 |
| 8515 | | LEAR | 04 | 13 | 0015 | S20 | E18 | 04 | 14.4 | | B | BXO | 20 | 8 | 4 | 4 |
| 8515 | | TACH | 04 | 13 | 0447 | S19 | E17 | 04 | 14.5 | | | AR | 28 | 8 | 4 | 3 |
| 8515 | | KAND | 04 | 13 | 0810 | S19 | E14 | 04 | 14.4 | | | BXO | | 5 | 4 | 4 |
| 8515 | | RAMY | 04 | 13 | 1219 | S19 | E12 | 04 | 14.4 | | B | BXO | 10 | 10 | 4 | 3 |
| 8515 | | HOLL | 04 | 13 | 1520 | S20 | E11 | 04 | 14.5 | | B | CSO | 10 | 6 | 5 | 1 |
| 8515 | 29056 | MWIL | 04 | 13 | 1600 | S19 | E10 | 04 | 14.4 | 4 | (B ) | | | | | |
| 8515 | | KAND | 04 | 14 | 1330 | S20 | E00 | 04 | 14.6 | | | BXO | | 7 | 4 | 3 |
| 8515 | 29056 | MWIL | 04 | 14 | 1545 | S19 | W01 | 04 | 14.6 | 4 | (BF) | | | | | |
| 8515 | | TACH | 04 | 15 | 0610 | S18 | W07 | 04 | 14.7 | | | AR | 58 | 4 | 3 | 3 |
| 8515 | | KAND | 04 | 15 | 0630 | S18 | W09 | 04 | 14.6 | | | CAO | | 15 | 5 | 4 |
| 8515 | 29056 | MWIL | 04 | 15 | 1430 | S19 | W13 | 04 | 14.6 | 5 | (B ) | | | | | |
| 8515 | | TACH | 04 | 16 | 0530 | S17 | W21 | 04 | 14.6 | | | CAI | 158 | 10 | 4 | 2 |
| 8515 | | KAND | 04 | 16 | 0700 | S19 | W23 | 04 | 14.5 | | | DAO | | 9 | 6 | 3 |
| 8515 | | RAMY | 04 | 16 | 1155 | S18 | W26 | 04 | 14.5 | | B | DAO | 60 | 10 | 6 | 3 |
| 8515 | 29056 | MWIL | 04 | 16 | 1700 | S19 | W28 | 04 | 14.6 | 4 | (B ) | | | | | |
| 8515 | | HOLL | 04 | 16 | 1846 | S19 | W27 | 04 | 14.7 | | B | DAO | 90 | 8 | 6 | 2 |
| 8515 | | SVTO | 04 | 17 | 0722 | S15 | W35 | 04 | 14.6 | | B | BXO | 20 | 6 | 9 | 3 |
| 8515 | | HOLL | 04 | 17 | 1440 | S18 | W40 | 04 | 14.6 | | B | DAO | 40 | 10 | 7 | 3 |
| 8515 | 29056 | MWIL | 04 | 17 | 1500 | S18 | W41 | 04 | 14.5 | 4 | (BP) | | | | | |
| 8515 | | LEAR | 04 | 18 | 0120 | S17 | W46 | 04 | 14.5 | | B | BXO | 20 | 5 | 7 | 3 |
| 8515 | | RAMY | 04 | 18 | 1216 | S19 | W49 | 04 | 14.8 | | A | AX | | 1 | | 3 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8515 | 29056 | MWIL | 04 18 1445 | S19 W53 | 04 14.6 | 3 | (B ) | | | | | |
| 8517 | 29060 | MWIL | 04 16 1700 | N23 W22 | 04 15.0 | 3 | B | | | | | |
| 8517 | | HOLL | 04 16 1846 | N20 W19 | 04 15.3 | | B | BXO | 20 | 4 | 3 | 2 |
| 8517 | | SVTO | 04 17 0722 | N22 W25 | 04 15.4 | | B | DSO | 20 | 2 | 8 | 3 |
| 8517 | | HOLL | 04 17 1440 | N17 W28 | 04 15.5 | | A | HR | 10 | 1 | 1 | 3 |
| 8517 | | HOLL | 04 17 1440 | N22 W33 | 04 15.1 | | B | CSO | 30 | 3 | 5 | 3 |
| 8517 | 29062 | MWIL | 04 17 1500 | N17 W29 | 04 15.4 | 4 | (AP) | | | | | |
| 8517 | 29060 | MWIL | 04 17 1500 | N23 W34 | 04 15.0 | 5 | (BP) | | | | | |
| 8517 | | LEAR | 04 18 0120 | N22 W38 | 04 15.1 | | B | CXO | 40 | 5 | 6 | 3 |
| 8517 | | TACH | 04 18 0345 | N22 W40 | 04 15.1 | | | BRO | 16 | 3 | 5 | 3 |
| 8517 | | SVTO | 04 18 0718 | N23 W44 | 04 14.9 | | B | BXO | 20 | 3 | 7 | 3 |
| 8517 | | KAND | 04 18 1020 | N22 W44 | 04 15.0 | | | DAO | | 3 | 7 | 2 |
| 8517 | | RAMY | 04 18 1216 | N21 W46 | 04 15.0 | | B | DRO | 20 | 5 | 7 | 3 |
| 8517 | 29060 | MWIL | 04 18 1445 | N22 W46 | 04 15.1 | 5 | (B ) | | | | | |
| 8517 | | HOLL | 04 18 1535 | N22 W46 | 04 15.1 | | B | DSO | 50 | 10 | 7 | 3 |
| 8517 | | LEAR | 04 19 0028 | N23 W51 | 04 15.1 | | B | DAO | 40 | 5 | 9 | 3 |
| 8517 | | SVTO | 04 19 0515 | N22 W55 | 04 15.0 | | B | DSO | 90 | 5 | 9 | 3 |
| 8517 | | KAND | 04 19 0705 | N21 W55 | 04 15.1 | | | DSO | | 5 | 9 | 2 |
| 8517 | 29060 | MWIL | 04 19 1445 | N22 W59 | 04 15.1 | 5 | (B ) | | | | | |
| 8517 | | HOLL | 04 19 1530 | N22 W60 | 04 15.0 | | B | CSO | 90 | 6 | 9 | 3 |
| 8517 | | RAMY | 04 19 1641 | N21 W58 | 04 15.2 | | B | DSO | 60 | 4 | 7 | 3 |
| 8517 | | LEAR | 04 20 0115 | N24 W67 | 04 14.9 | | B | EAO | 160 | 3 | 11 | 4 |
| 8517 | | TACH | 04 20 0520 | N23 W68 | 04 15.0 | | | DSO | 90 | 2 | 8 | 3 |
| 8517 | | SVTO | 04 20 0605 | N21 W70 | 04 14.9 | | B | DSO | 110 | 2 | 10 | 3 |
| 8517 | | KAND | 04 20 0735 | N22 W70 | 04 14.9 | | | CAO | | 2 | 9 | 5 |
| 8517 | | RAMY | 04 20 1336 | N19 W68 | 04 15.4 | | B | DSO | 40 | 3 | 7 | 3 |
| 8517 | 29060 | MWIL | 04 20 1445 | N22 W72 | 04 15.1 | 4 | (B ) | | | | | |
| 8517 | | HOLL | 04 20 1449 | N22 W70 | 04 15.2 | | B | DSO | 60 | 4 | 8 | 4 |
| 8517 | | LEAR | 04 21 0114 | N25 W73 | 04 15.4 | | A | HA | 60 | 2 | 4 | 4 |
| 8517 | | SVTO | 04 21 0820 | N23 W85 | 04 14.8 | | A | AX | 10 | 1 | | 2 |
| 8517 | | RAMY | 04 21 1153 | N22 W84 | 04 15.0 | | A | HS | 20 | 1 | 2 | 3 |
| 8515B | 29059 | MWIL | 04 15 1430 | S15 W02 | 04 15.4 | 2 | X | | | | | |
| 8515B | | RAMY | 04 16 1155 | S18 W16 | 04 15.3 | | A | AX | 10 | 1 | | 3 |
| 8519 | | LEAR | 04 18 0120 | N18 W35 | 04 15.4 | | A | AX | | 1 | | 3 |
| 8517A | 29057 | MWIL | 04 13 1600 | N22 E20 | 04 15.2 | 4 | (AP) | | | | | |
| 8517A | 29057 | MWIL | 04 14 1545 | N25 E12 | 04 15.6 | 4 | (AP) | | | | | |
| 8517B | | KAND | 04 16 0700 | N09 W09 | 04 15.6 | | | AX | | 1 | | 3 |
| 8521 | 29064 | MWIL | 04 18 1445 | N34 E11 | 04 19.5 | 3 | (B ) | | | | | |
| 8521 | | HOLL | 04 18 1535 | N34 E11 | 04 19.5 | | A | AX | | 1 | | 3 |
| 8521 | 29064 | MWIL | 04 19 1445 | N34 W01 | 04 19.5 | 4 | (B ) | | | | | |
| 8521 | | RAMY | 04 19 1641 | N34 W03 | 04 19.4 | | B | BXO | | 3 | 3 | 3 |
| 8521 | | SVTO | 04 20 0605 | N33 W09 | 04 19.5 | | A | AX | | 1 | | 3 |
| 8521 | | RAMY | 04 20 1336 | N32 W16 | 04 19.3 | | A | AX | | 1 | | 3 |
| 8521 | | RAMY | 04 21 1153 | N34 W28 | 04 19.3 | | B | BXO | 10 | 5 | 3 | 3 |
| 8521 | | KAND | 04 21 1420 | N34 W28 | 04 19.4 | | | CAO | | 2 | 4 | 2 |
| 8521 | | HOLL | 04 21 1602 | N34 W32 | 04 19.1 | | B | CSO | 40 | 3 | 4 | 4 |
| 8521 | 29066 | MWIL | 04 21 1845 | N34 W31 | 04 19.3 | 4 | (BP) | | | | | |
| 8521 | | LEAR | 04 22 0029 | N35 W32 | 04 19.5 | | B | CSO | 30 | 8 | 7 | 4 |
| 8521 | | KAND | 04 22 0700 | N33 W38 | 04 19.3 | | | CAO | | 7 | 7 | 5 |
| 8521 | | RAMY | 04 22 1239 | N33 W42 | 04 19.2 | | B | CSO | 30 | 5 | 5 | 3 |
| 8521 | | HOLL | 04 22 1432 | N34 W43 | 04 19.2 | | B | CAO | 30 | 7 | 7 | 4 |
| 8521 | 29066 | MWIL | 04 22 1445 | N34 W44 | 04 19.1 | 4 | (BP) | | | | | |
| 8521 | | LEAR | 04 23 0045 | N34 W46 | 04 19.4 | | B | CAO | 50 | 3 | 8 | 4 |
| 8521 | | TACH | 04 23 0500 | N34 W50 | 04 19.2 | | | CSO | 30 | 2 | 7 | 2 |
| 8521 | | KAND | 04 23 0950 | N33 W53 | 04 19.2 | | | AX | | 1 | 1 | 3 |
| 8521 | | SVTO | 04 23 1210 | N36 W55 | 04 19.1 | | B | CRO | 20 | 5 | 9 | 3 |
| 8521 | | HOLL | 04 23 1450 | N33 W55 | 04 19.2 | | B | CSO | 20 | 3 | 8 | 3 |
| 8521 | 29066 | MWIL | 04 23 1600 | N33 W56 | 04 19.2 | 4 | (BP) | | | | | |
| 8521 | | LEAR | 04 24 0040 | N33 W63 | 04 19.0 | | A | HA | 30 | 1 | 1 | 5 |
| 8521 | | TACH | 04 24 0406 | N33 W65 | 04 19.0 | | | AXX | 5 | 1 | 1 | 3 |
| 8521 | | KAND | 04 24 0800 | N32 W68 | 04 18.9 | | | AX | | 1 | 1 | 4 |
| 8521 | | RAMY | 04 24 1152 | N31 W69 | 04 19.0 | | A | AX | | 1 | | 3 |
| 8521 | | SVTO | 04 24 1441 | N34 W73 | 04 18.8 | | A | AX | 10 | 1 | 1 | 2 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

### APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max N | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8516A | | HOLL | 04 21 1602 | S07 W24 | 04 19.9 | | A | AX | 10 | 3 | 2 | 4 |
| 8516 | | KAND | 04 14 1330 | S20 E75 | 04 20.3 | | | CAO | | 3 | 9 | 3 |
| 8516 | 29058 | MWIL | 04 14 1545 | S19 E73 | 04 20.2 | 4 | (B ) | | | | | |
| 8516 | | TACH | 04 15 0610 | S18 E61 | 04 19.9 | | | HSX | 60 | 1 | 2 | 3 |
| 8516 | | KAND | 04 15 0630 | S18 E66 | 04 20.3 | | | CAO | | 6 | 8 | 4 |
| 8516 | 29058 | MWIL | 04 15 1430 | S19 E61 | 04 20.2 | 5 | (B ) | | | | | |
| 8516 | | TACH | 04 16 0530 | S22 E53 | 04 20.3 | | | CAO | 54 | 4 | 10 | 2 |
| 8516 | | KAND | 04 16 0700 | S20 E53 | 04 20.3 | | | CSO | | 8 | 9 | 3 |
| 8516 | | RAMY | 04 16 1155 | S21 E49 | 04 20.2 | | B | CAO | 70 | 10 | 9 | 3 |
| 8516 | 29058 | MWIL | 04 16 1700 | S19 E45 | 04 20.1 | 5 | (BP) | | | | | |
| 8516 | | HOLL | 04 16 1846 | S19 E47 | 04 20.4 | | B | CAO | 80 | 4 | 7 | 2 |
| 8516 | | SVTO | 04 17 0722 | S21 E39 | 04 20.3 | | B | CAO | 80 | 3 | 9 | 3 |
| 8516 | | HOLL | 04 17 1440 | S18 E35 | 04 20.3 | | B | CAO | 80 | 7 | 9 | 3 |
| 8516 | 29058 | MWIL | 04 17 1500 | S20 E33 | 04 20.1 | 5 | (BP) | | | | | |
| 8516 | | LEAR | 04 18 0120 | S19 E27 | 04 20.1 | | B | CXO | 70 | 8 | 8 | 3 |
| 8516 | | TACH | 04 18 0345 | S19 E23 | 04 19.9 | | | HSX | 51 | 1 | 1 | 3 |
| 8516 | | SVTO | 04 18 0718 | S18 E24 | 04 20.1 | | B | CSO | 50 | 2 | 5 | 3 |
| 8516 | | KAND | 04 18 1020 | S19 E21 | 04 20.0 | | | HA | | 3 | 2 | 2 |
| 8516 | | RAMY | 04 18 1216 | S18 E22 | 04 20.2 | | B | CSO | 40 | 5 | 6 | 3 |
| 8516 | 29058 | MWIL | 04 18 1445 | S20 E20 | 04 20.1 | 5 | (BP) | | | | | |
| 8516 | | HOLL | 04 18 1535 | S19 E21 | 04 20.2 | | B | CSO | 60 | 5 | 6 | 3 |
| 8516 | | LEAR | 04 19 0028 | S19 E14 | 04 20.1 | | B | CAO | 50 | 4 | 5 | 3 |
| 8516 | | SVTO | 04 19 0515 | S18 E13 | 04 20.2 | | B | CSO | 60 | 5 | 7 | 3 |
| 8516 | | KAND | 04 19 0705 | S19 E10 | 04 20.0 | | | HA | | 3 | 2 | 2 |
| 8516 | 29058 | MWIL | 04 19 1445 | S20 E07 | 04 20.2 | 4 | (B ) | | | | | |
| 8516 | | HOLL | 04 19 1530 | S19 E07 | 04 20.2 | | B | CSO | 130 | 4 | 6 | 3 |
| 8516 | | RAMY | 04 19 1641 | S18 E07 | 04 20.2 | | B | CAO | 40 | 6 | 7 | 3 |
| 8516 | | LEAR | 04 20 0115 | S18 E02 | 04 20.2 | | B | CSO | 60 | 4 | 4 | 4 |
| 8516 | | TACH | 04 20 0520 | S18 W01 | 04 20.1 | | | CSO | 105 | 3 | 3 | 3 |
| 8516 | | SVTO | 04 20 0605 | S18 W03 | 04 20.0 | | B | CSO | 20 | 2 | 4 | 3 |
| 8516 | | KAND | 04 20 0735 | S18 W02 | 04 20.2 | | | CAO | | 2 | 4 | 5 |
| 8516 | | RAMY | 04 20 1336 | S20 W05 | 04 20.2 | | B | CSO | 40 | 4 | 4 | 3 |
| 8516 | 29058 | MWIL | 04 20 1445 | S20 W07 | 04 20.1 | 4 | (BP) | | | | | |
| 8516 | | HOLL | 04 20 1449 | S20 W07 | 04 20.1 | | B | CSO | 40 | 3 | 6 | 4 |
| 8516 | | LEAR | 04 21 0114 | S19 W14 | 04 20.0 | | A | HS | 60 | 3 | 2 | 4 |
| 8516 | | SVTO | 04 21 0820 | S19 W18 | 04 20.0 | | A | HA | 20 | 1 | 1 | 2 |
| 8516 | | RAMY | 04 21 1153 | S20 W18 | 04 20.1 | | B | CAO | 40 | 4 | 3 | 3 |
| 8516 | | KAND | 04 21 1420 | S20 W20 | 04 20.1 | | | HS | | 1 | 2 | 2 |
| 8516 | | HOLL | 04 21 1602 | S19 W21 | 04 20.1 | | B | CSO | 50 | 2 | 4 | 4 |
| 8516 | 29058 | MWIL | 04 21 1845 | S20 W23 | 04 20.0 | 4 | (AP) | | | | | |
| 8516 | | LEAR | 04 22 0029 | S19 W26 | 04 20.0 | | A | HS | 40 | 2 | 2 | 4 |
| 8516 | | KAND | 04 22 0700 | S20 W27 | 04 20.2 | | | CAO | | 4 | 7 | 5 |
| 8516 | | RAMY | 04 22 1239 | S20 W29 | 04 20.3 | | B | CSO | 20 | 2 | 7 | 3 |
| 8516 | | HOLL | 04 22 1432 | S21 W29 | 04 20.4 | | B | CSO | 30 | 6 | 8 | 4 |
| 8516 | 29058 | MWIL | 04 22 1445 | S20 W32 | 04 20.2 | 5 | (BP) | | | | | |
| 8516 | | LEAR | 04 23 0045 | S19 W37 | 04 20.2 | | B | CAO | 40 | 11 | 7 | 4 |
| 8516 | | TACH | 04 23 0500 | S19 W38 | 04 20.3 | | | CSO | 51 | 2 | 6 | 2 |
| 8516 | | KAND | 04 23 0950 | S19 W42 | 04 20.2 | | | CAO | | 3 | 5 | 3 |
| 8516 | | SVTO | 04 23 1210 | S19 W45 | 04 20.1 | | B | CRO | 10 | 4 | 5 | 3 |
| 8516 | | HOLL | 04 23 1450 | S20 W44 | 04 20.2 | | B | CAO | 30 | 7 | 6 | 3 |
| 8516 | 29058 | MWIL | 04 23 1600 | S20 W45 | 04 20.2 | 4 | (B ) | | | | | |
| 8516 | | LEAR | 04 24 0040 | S19 W50 | 04 20.2 | | B | CAO | 30 | 12 | 7 | 5 |
| 8516 | | TACH | 04 24 0406 | S18 W51 | 04 20.3 | | | BRO | 16 | 4 | 7 | 3 |
| 8516 | | KAND | 04 24 0800 | S19 W53 | 04 20.3 | | | BXO | | 5 | 7 | 4 |
| 8516 | | RAMY | 04 24 1152 | S19 W54 | 04 20.4 | | B | CRO | 10 | 9 | 9 | 3 |
| 8516 | | SVTO | 04 24 1441 | S18 W58 | 04 20.2 | | B | BXO | 10 | 4 | 8 | 2 |
| 8516 | | HOLL | 04 24 1900 | S20 W62 | 04 20.0 | | A | AX | 10 | 1 | | 2 |
| 8520 | 29065 | MWIL | 04 18 1445 | N20 E31 | 04 21.0 | 3 | (AF) | | | | | |
| 8520 | | LEAR | 04 19 0028 | N19 E27 | 04 21.1 | | A | HR | 10 | 1 | | 3 |
| 8520 | | SVTO | 04 19 0515 | N20 E21 | 04 20.8 | | B | DSO | 20 | 3 | 4 | 3 |
| 8520 | | KAND | 04 19 0705 | N19 E20 | 04 20.8 | | | BXO | | 4 | 3 | 2 |
| 8520 | 29065 | MWIL | 04 19 1445 | N20 E17 | 04 20.9 | 4 | (BP) | | | | | |
| 8520 | | HOLL | 04 19 1530 | N19 E16 | 04 20.9 | | B | BXO | 10 | 6 | 5 | 3 |
| 8520 | | RAMY | 04 19 1641 | N20 E14 | 04 20.8 | | B | CRO | 20 | 7 | 4 | 3 |
| 8520 | | LEAR | 04 20 0115 | N19 E12 | 04 21.0 | | B | BXO | 20 | 9 | 6 | 4 |
| 8520 | | TACH | 04 20 0520 | N21 E10 | 04 21.0 | | | AR | 35 | 3 | 1 | 3 |
| 8520 | | SVTO | 04 20 0605 | N20 E08 | 04 20.9 | | B | BXO | 10 | 3 | 4 | 3 |

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## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8520 | | KAND | 04 20 0735 | N21 E08 | 04 20.9 | | | BXO | | 2 | 3 | 5 |
| 8520 | | RAMY | 04 20 1336 | N20 E04 | 04 20.9 | | B | BXO | 10 | 4 | 2 | 3 |
| 8520 | 29065 | MWIL | 04 20 1445 | N20 E03 | 04 20.8 | 4 | (BF) | | | | | |
| 8520 | | HOLL | 04 20 1449 | N19 E05 | 04 21.0 | | A | AX | 10 | 3 | 2 | 4 |
| 8520 | | LEAR | 04 21 0114 | N19 W03 | 04 20.8 | | B | BXO | | 4 | 6 | 4 |
| 8518 | 29061 | MWIL | 04 16 1700 | S13 E83 | 04 23.0 | 2 | AP | | | | | |
| 8518 | | SVTO | 04 17 0722 | S18 E75 | 04 23.0 | | A | AX | 10 | 2 | 2 | 3 |
| 8518 | | HOLL | 04 17 1440 | S13 E71 | 04 23.0 | | A | HA | 110 | 2 | 2 | 3 |
| 8518 | 29061 | MWIL | 04 17 1500 | S13 E70 | 04 22.9 | 4 | (BP) | | | | | |
| 8518 | | LEAR | 04 18 0120 | S15 E64 | 04 22.9 | | A | HA | 80 | 4 | 2 | 3 |
| 8518 | | TACH | 04 18 0345 | S13 E62 | 04 22.8 | | | HSX | 150 | 1 | 2 | 3 |
| 8518 | | SVTO | 04 18 0718 | S14 E61 | 04 22.9 | | A | HA | 80 | 2 | 1 | 3 |
| 8518 | | KAND | 04 18 1020 | S13 E60 | 04 22.9 | | | HS | | 3 | 2 | 2 |
| 8518 | | RAMY | 04 18 1216 | S12 E58 | 04 22.9 | | A | HS | 60 | 4 | 3 | 3 |
| 8518 | 29061 | MWIL | 04 18 1445 | S13 E57 | 04 22.9 | 5 | (BP) | | | | | |
| 8518 | | HOLL | 04 18 1535 | S14 E58 | 04 23.0 | | A | HS | 90 | 4 | 3 | 3 |
| 8518 | | LEAR | 04 19 0028 | S15 E51 | 04 22.9 | | A | HA | 80 | 4 | 2 | 3 |
| 8518 | | SVTO | 04 19 0515 | S13 E50 | 04 23.0 | | B | CAO | 100 | 7 | 6 | 3 |
| 8518 | | KAND | 04 19 0705 | S13 E49 | 04 23.0 | | | CAO | | 6 | 6 | 2 |
| 8518 | 29061 | MWIL | 04 19 1445 | S14 E46 | 04 23.1 | 5 | (BP) | | | | | |
| 8518 | | HOLL | 04 19 1530 | S14 E46 | 04 23.1 | | B | DSO | 50 | 15 | 7 | 3 |
| 8518 | | RAMY | 04 19 1641 | S13 E44 | 04 23.0 | | B | DSO | 150 | 12 | 7 | 3 |
| 8518 | | LEAR | 04 20 0115 | S15 E41 | 04 23.1 | | B | DAI | 190 | 16 | 7 | 4 |
| 8518 | | TACH | 04 20 0520 | S14 E38 | 04 23.1 | | | CAI | 330 | 9 | 6 | 3 |
| 8518 | | SVTO | 04 20 0605 | S14 E36 | 04 23.0 | | B | DSI | 160 | 11 | 8 | 3 |
| 8518 | | KAND | 04 20 0735 | S14 E37 | 04 23.1 | | | DAI | | 12 | 8 | 5 |
| 8518 | | RAMY | 04 20 1336 | S14 E34 | 04 23.1 | | B | DAO | 150 | 20 | 7 | 3 |
| 8518 | 29061 | MWIL | 04 20 1445 | S14 E34 | 04 23.2 | 5 | (BP) | | | | | |
| 8518 | | HOLL | 04 20 1449 | S15 E34 | 04 23.2 | | B | DSO | 150 | 18 | 8 | 4 |
| 8518 | | LEAR | 04 21 0114 | S16 E27 | 04 23.1 | | B | DAI | 170 | 19 | 8 | 4 |
| 8518 | | SVTO | 04 21 0820 | S15 E25 | 04 23.2 | | B | CAO | 180 | 13 | 9 | 2 |
| 8518 | | RAMY | 04 21 1153 | S14 E22 | 04 23.1 | | B | DAO | 170 | 17 | 8 | 3 |
| 8518 | | KAND | 04 21 1420 | S13 E20 | 04 23.1 | | | DAO | | 7 | 7 | 2 |
| 8518 | | HOLL | 04 21 1602 | S14 E18 | 04 23.0 | | B | DSO | 120 | 18 | 8 | 4 |
| 8518 | 29061 | MWIL | 04 21 1845 | S14 E17 | 04 23.1 | 5 | (BP) | | | | | |
| 8518 | | LEAR | 04 22 0029 | S15 E15 | 04 23.1 | | B | DAO | 130 | 15 | 9 | 4 |
| 8518 | | KAND | 04 22 0700 | S14 E10 | 04 23.0 | | | CAO | | 13 | 7 | 5 |
| 8518 | | RAMY | 04 22 1239 | S14 E08 | 04 23.1 | | B | DAO | 170 | 15 | 6 | 3 |
| 8518 | | HOLL | 04 22 1432 | S15 E09 | 04 23.3 | | B | EAO | 200 | 20 | 11 | 4 |
| 8518 | 29061 | MWIL | 04 22 1445 | S14 E07 | 04 23.1 | 4 | (BP) | | | | | |
| 8518 | | LEAR | 04 23 0045 | S15 E03 | 04 23.2 | | B | DAO | 140 | 21 | 10 | 4 |
| 8518 | | TACH | 04 23 0500 | S13 W00 | 04 23.2 | | | DAO | 265 | 4 | 4 | 2 |
| 8518 | | KAND | 04 23 0950 | S13 W03 | 04 23.2 | | | DSI | | 9 | 5 | 3 |
| 8518 | | SVTO | 04 23 1210 | S14 W03 | 04 23.3 | | B | DAO | 180 | 18 | 10 | 3 |
| 8518 | | HOLL | 04 23 1450 | S14 W06 | 04 23.2 | | B | DAO | 150 | 15 | 6 | 3 |
| 8518 | 29061 | MWIL | 04 23 1600 | S14 W06 | 04 23.2 | 5 | (BP) | | | | | |
| 8518 | | LEAR | 04 24 0040 | S14 W12 | 04 23.1 | | B | DAO | 130 | 12 | 6 | 5 |
| 8518 | | TACH | 04 24 0406 | S12 W14 | 04 23.1 | | | DAO | 201 | 3 | 2 | 3 |
| 8518 | | KAND | 04 24 0800 | S13 W16 | 04 23.1 | | | DAO | | 2 | 4 | 4 |
| 8518 | | RAMY | 04 24 1152 | S15 W16 | 04 23.3 | | B | CAO | 110 | 8 | 9 | 3 |
| 8518 | | SVTO | 04 24 1441 | S15 W17 | 04 23.3 | | B | CAO | 100 | 5 | 10 | 2 |
| 8518 | | HOLL | 04 24 1900 | S14 W22 | 04 23.1 | | B | DAO | 70 | 5 | 4 | 2 |
| 8518 | | LEAR | 04 25 0125 | S13 W26 | 04 23.1 | | B | DAO | 60 | 7 | 3 | 3 |
| 8518 | | TACH | 04 25 0338 | S12 W28 | 04 23.0 | | | HA | 105 | 5 | 3 | 4 |
| 8518 | | KAND | 04 25 0730 | S13 W29 | 04 23.1 | | | HS | | 3 | 2 | 3 |
| 8518 | | RAMY | 04 25 1116 | S14 W31 | 04 23.1 | | B | CAO | 90 | 8 | 4 | 5 |
| 8518 | 29061 | MWIL | 04 25 1445 | S14 W34 | 04 23.0 | 5 | (AP) | | | | | |
| 8518 | | HOLL | 04 25 1455 | S13 W33 | 04 23.1 | | A | HS | 90 | 1 | 2 | 3 |
| 8518 | | LEAR | 04 26 0137 | S12 W40 | 04 23.0 | | A | HS | 110 | 3 | 2 | 4 |
| 8518 | | TACH | 04 26 0514 | S12 W41 | 04 23.1 | | | HR | 82 | 2 | 2 | 3 |
| 8518 | | SVTO | 04 26 0530 | S12 W42 | 04 23.1 | | A | HS | 70 | 2 | 2 | 3 |
| 8518 | | KAND | 04 26 0625 | S13 W41 | 04 23.2 | | | HA | | 1 | 2 | 4 |
| 8518 | | RAMY | 04 26 1128 | S16 W44 | 04 23.1 | | B | CAO | 90 | 3 | 4 | 4 |
| 8518 | 29061 | MWIL | 04 26 1430 | S13 W47 | 04 23.0 | 5 | (AP) | | | | | |
| 8518 | | HOLL | 04 26 1455 | S13 W47 | 04 23.1 | | A | HS | 90 | 1 | 2 | 3 |
| 8518 | | KAND | 04 27 0650 | S13 W56 | 04 23.0 | | | HS | | 1 | 2 | 3 |
| 8518 | 29061 | MWIL | 04 27 1445 | S13 W60 | 04 23.1 | 5 | (AP) | | | | | |
| 8518 | | SVTO | 04 28 0740 | S13 W71 | 04 23.0 | | A | HA | 90 | 1 | 3 | 3 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Mo | Day | Time (UT) | Lat | CMD | CMP Mo | Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8518 | | KAND | 04 | 28 | 1110 | S13 | W69 | 04 | 23.2 | | | HA | | 1 | 2 | 2 |
| 8518 | | RAMY | 04 | 28 | 1200 | S12 | W70 | 04 | 23.2 | | A | HS | 50 | 1 | 2 | 4 |
| 8518 | | HOLL | 04 | 28 | 1504 | S14 | W73 | 04 | 23.1 | | A | HS | 50 | 1 | 2 | 1 |
| 8518 | | LEAR | 04 | 29 | 0129 | S12 | W78 | 04 | 23.2 | | A | HS | 60 | 1 | 2 | 4 |
| 8518 | | TACH | 04 | 29 | 0446 | S12 | W86 | 04 | 22.7 | | | HSX | 30 | 1 | 2 | 4 |
| 8518 | | KAND | 04 | 29 | 0705 | S13 | W84 | 04 | 22.9 | | | HA | | 1 | 3 | 4 |
| 8518 | | SVTO | 04 | 29 | 0715 | S14 | W88 | 04 | 22.6 | | A | HS | 50 | 1 | 3 | 3 |
| 8523 | | RAMY | 04 | 24 | 1152 | N32 | E48 | 04 | 28.3 | | B | BXO | | 3 | 6 | 3 |
| 8523 | | HOLL | 04 | 24 | 1900 | N31 | E45 | 04 | 28.3 | | B | BXO | | 2 | 8 | 2 |
| 8523 | | LEAR | 04 | 25 | 0125 | N30 | E41 | 04 | 28.3 | | B | BXO | 10 | 2 | 4 | 3 |
| 8523 | | TACH | 04 | 25 | 0338 | N35 | E37 | 04 | 28.1 | | | AR | 6 | 2 | 2 | 4 |
| 8523 | | KAND | 04 | 25 | 0730 | N31 | E36 | 04 | 28.1 | | | BXO | | 4 | 5 | 3 |
| 8523 | | RAMY | 04 | 25 | 1116 | N32 | E34 | 04 | 28.2 | | B | BXO | | 5 | 4 | 5 |
| 8523 | 29068 | MWIL | 04 | 25 | 1445 | N31 | E33 | 04 | 28.2 | 4 | (B ) | | | | | |
| 8523 | | HOLL | 04 | 25 | 1455 | N31 | E33 | 04 | 28.2 | | B | BXO | 10 | 3 | 4 | 3 |
| 8523 | | LEAR | 04 | 26 | 0137 | N29 | E28 | 04 | 28.3 | | B | CAO | 40 | 9 | 6 | 4 |
| 8523 | | TACH | 04 | 26 | 0514 | N31 | E24 | 04 | 28.1 | | | BRI | 11 | 5 | 3 | 3 |
| 8523 | | SVTO | 04 | 26 | 0530 | N31 | E27 | 04 | 28.3 | | B | CRO | 30 | 8 | 5 | 3 |
| 8523 | | KAND | 04 | 26 | 0625 | N31 | E23 | 04 | 28.1 | | | DRO | | 4 | 4 | 4 |
| 8523 | | RAMY | 04 | 26 | 1128 | N31 | E21 | 04 | 28.1 | | B | BXO | 20 | 10 | 4 | 4 |
| 8523 | 29068 | MWIL | 04 | 26 | 1430 | N31 | E20 | 04 | 28.2 | 4 | (BP) | | | | | |
| 8523 | | HOLL | 04 | 26 | 1455 | N31 | E19 | 04 | 28.1 | | B | BXO | 20 | 8 | 4 | 3 |
| 8523 | | KAND | 04 | 27 | 0650 | N31 | E13 | 04 | 28.3 | | | CAO | | 6 | 8 | 3 |
| 8523 | 29070 | MWIL | 04 | 27 | 1445 | N30 | E12 | 04 | 28.5 | 4 | (AP) | | | | | |
| 8523 | 29068 | MWIL | 04 | 27 | 1445 | N31 | E07 | 04 | 28.2 | 4 | (B ) | | | | | |
| 8523 | | SVTO | 04 | 28 | 0740 | N33 | W01 | 04 | 28.2 | | B | DAO | 60 | 10 | 5 | 3 |
| 8523 | | KAND | 04 | 28 | 1110 | N32 | W02 | 04 | 28.3 | | | CRO | | 8 | 6 | 2 |
| 8523 | | RAMY | 04 | 28 | 1200 | N32 | W03 | 04 | 28.3 | | B | CRO | 30 | 12 | 6 | 4 |
| 8523 | | HOLL | 04 | 28 | 1504 | N30 | W04 | 04 | 28.3 | | B | BXO | 30 | 13 | 6 | 1 |
| 8523 | | LEAR | 04 | 29 | 0129 | N32 | W09 | 04 | 28.3 | | B | CSO | 30 | 5 | 4 | 4 |
| 8523 | | TACH | 04 | 29 | 0446 | N31 | W11 | 04 | 28.3 | | | BSO | 15 | 2 | 4 | 4 |
| 8523 | | KAND | 04 | 29 | 0705 | N32 | W13 | 04 | 28.3 | | | BXO | | 3 | 4 | 4 |
| 8523 | | SVTO | 04 | 29 | 0715 | N32 | W13 | 04 | 28.3 | | B | BXO | 10 | 3 | 5 | 3 |
| 8523 | | RAMY | 04 | 29 | 1223 | N31 | W15 | 04 | 28.3 | | B | CSO | 20 | 4 | 4 | 3 |
| 8523 | | HOLL | 04 | 29 | 1444 | N31 | W17 | 04 | 28.3 | | B | BXO | 10 | 4 | 5 | 3 |
| 8523 | 29070 | MWIL | 04 | 29 | 1445 | N32 | W17 | 04 | 28.3 | 4 | (AP) | | | | | |
| 8523 | | LEAR | 04 | 30 | 0105 | N32 | W22 | 04 | 28.3 | | B | BXO | 10 | 4 | 4 | 4 |
| 8523 | | TACH | 04 | 30 | 0438 | N33 | W26 | 04 | 28.1 | | | AXX | 5 | 1 | 1 | 3 |
| 8523 | | RAMY | 04 | 30 | 1315 | N32 | W30 | 04 | 28.2 | | A | AX | | 1 | | 3 |
| 8523 | | HOLL | 04 | 30 | 1540 | N33 | W31 | 04 | 28.2 | | A | AX | | 1 | | 3 |
| 8523 | | LEAR | 05 | 01 | 0042 | N32 | W33 | 04 | 28.5 | | B | BXO | 10 | 3 | 4 | 4 |
| 8523 | | RAMY | 05 | 01 | 1207 | N31 | W34 | 04 | 28.9 | | A | AX | | 1 | | 4 |
| 8523 | 29070 | MWIL | 05 | 01 | 1445 | N32 | W36 | 04 | 28.9 | 4 | (B ) | | | | | |
| 8523 | | HOLL | 05 | 01 | 1525 | N32 | W37 | 04 | 28.8 | | A | AX | | 1 | | 3 |
| 8523 | | LEAR | 05 | 02 | 0106 | N32 | W43 | 04 | 28.7 | | B | BXO | 30 | 3 | 3 | 3 |
| 8523 | | RAMY | 05 | 02 | 1258 | N32 | W52 | 04 | 28.5 | | B | BXO | 10 | 3 | 8 | 3 |
| 8523 | 29070 | MWIL | 05 | 02 | 1445 | N32 | W54 | 04 | 28.4 | 3 | (B ) | | | | | |
| 8524 | | RAMY | 04 | 24 | 1152 | N22 | E58 | 04 | 28.9 | | A | AX | | 1 | | 3 |
| 8524 | | LEAR | 04 | 25 | 0125 | N20 | E52 | 04 | 29.0 | | B | DSO | 50 | 7 | 5 | 3 |
| 8524 | | TACH | 04 | 25 | 0338 | N21 | E48 | 04 | 28.8 | | | CAI | 53 | 8 | 5 | 4 |
| 8524 | | KAND | 04 | 25 | 0730 | N21 | E47 | 04 | 28.9 | | | DAO | | 5 | 5 | 3 |
| 8524 | | RAMY | 04 | 25 | 1116 | N23 | E45 | 04 | 28.9 | | B | DSO | 130 | 9 | 6 | 5 |
| 8524 | 29069 | MWIL | 04 | 25 | 1445 | N22 | E44 | 04 | 29.0 | 5 | (B ) | | | | | |
| 8524 | | HOLL | 04 | 25 | 1455 | N21 | E44 | 04 | 29.0 | | B | DSO | 180 | 7 | 7 | 3 |
| 8524 | | LEAR | 04 | 26 | 0137 | N20 | E37 | 04 | 28.9 | | B | DAI | 260 | 9 | 8 | 4 |
| 8524 | | TACH | 04 | 26 | 0514 | N19 | E35 | 04 | 28.9 | | | DSI | 228 | 5 | 6 | 3 |
| 8524 | | SVTO | 04 | 26 | 0530 | N22 | E36 | 04 | 29.0 | | B | DAO | 170 | 8 | 7 | 3 |
| 8524 | | KAND | 04 | 26 | 0625 | N22 | E34 | 04 | 28.9 | | | DSO | | 3 | 8 | 4 |
| 8524 | | RAMY | 04 | 26 | 1128 | N23 | E32 | 04 | 28.9 | | B | DAO | 250 | 13 | 9 | 4 |
| 8524 | 29069 | MWIL | 04 | 26 | 1430 | N22 | E30 | 04 | 28.9 | 5 | (B ) | | | | | |
| 8524 | | HOLL | 04 | 26 | 1455 | N22 | E29 | 04 | 28.8 | | B | DSO | 190 | 10 | 7 | 3 |
| 8524 | | KAND | 04 | 27 | 0650 | N22 | E20 | 04 | 28.8 | | | DAO | | 9 | 10 | 3 |
| 8524 | 29069 | MWIL | 04 | 27 | 1445 | N22 | E16 | 04 | 28.8 | 5 | (BG) | | | | | |
| 8524 | | SVTO | 04 | 28 | 0740 | N23 | E06 | 04 | 28.8 | | B | EHO | 330 | 21 | 14 | 3 |
| 8524 | | KAND | 04 | 28 | 1110 | N22 | E05 | 04 | 28.8 | | | EKO | | 20 | 13 | 2 |
| 8524 | | RAMY | 04 | 28 | 1200 | N22 | E03 | 04 | 28.7 | | B | EKO | 280 | 17 | 12 | 4 |
| 8524 | | HOLL | 04 | 28 | 1504 | N21 | E02 | 04 | 28.8 | | B | EKO | 310 | 20 | 14 | 1 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Mo | Day | Time (UT) | Lat | CMD | CMP Mo | Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8524 | | LEAR | 04 | 29 | 0129 | N22 | W03 | 04 | 28.8 | | B | EKO | 280 | 25 | 13 | 4 |
| 8524 | | TACH | 04 | 29 | 0446 | N20 | W07 | 04 | 28.7 | | | DAI | 458 | 16 | 10 | 4 |
| 8524 | | KAND | 04 | 29 | 0705 | N23 | W08 | 04 | 28.7 | | | EKO | | 13 | 14 | 4 |
| 8524 | | SVTO | 04 | 29 | 0715 | N23 | W07 | 04 | 28.8 | | B | EKI | 410 | 20 | 14 | 3 |
| 8524 | | RAMY | 04 | 29 | 1223 | N22 | W09 | 04 | 28.8 | | B | EAO | 290 | 22 | 13 | 3 |
| 8524 | | HOLL | 04 | 29 | 1444 | N22 | W11 | 04 | 28.8 | | B | EAI | 290 | 28 | 13 | 3 |
| 8524 | 29069 | MWIL | 04 | 29 | 1445 | N22 | W11 | 04 | 28.8 | 4 | (D ) | | | | | |
| 8524 | | LEAR | 04 | 30 | 0105 | N22 | W16 | 04 | 28.8 | | B | EKI | 290 | 30 | 14 | 4 |
| 8524 | | TACH | 04 | 30 | 0438 | N22 | W17 | 04 | 28.9 | | | EAI | 279 | 17 | 12 | 3 |
| 8524 | | KAND | 04 | 30 | 0635 | N21 | W20 | 04 | 28.7 | | | EAO | | 34 | 15 | 3 |
| 8524 | | SVTO | 04 | 30 | 0747 | N23 | W15 | 04 | 29.2 | | B | CAO | 140 | 12 | 6 | 3 |
| 8524 | | RAMY | 04 | 30 | 1315 | N21 | W22 | 04 | 28.9 | | BG | EAI | 230 | 25 | 15 | 3 |
| 8524 | | HOLL | 04 | 30 | 1540 | N20 | W24 | 04 | 28.8 | | BG | ESI | 270 | 28 | 13 | 3 |
| 8524 | | LEAR | 05 | 01 | 0042 | N22 | W28 | 04 | 29.0 | | BG | EAI | 230 | 29 | 14 | 4 |
| 8524 | | SVTO | 05 | 01 | 0722 | N22 | W30 | 04 | 29.1 | | BG | EAI | 160 | 25 | 15 | 3 |
| 8524 | | KAND | 05 | 01 | 0905 | N24 | W34 | 04 | 28.8 | | | EAO | | 20 | 14 | 4 |
| 8524 | | RAMY | 05 | 01 | 1207 | N21 | W34 | 04 | 29.0 | | BG | EAO | 110 | 28 | 15 | 4 |
| 8524 | 29069 | MWIL | 05 | 01 | 1445 | N21 | W37 | 04 | 28.9 | 5 | (D ) | | | | | |
| 8524 | | HOLL | 05 | 01 | 1525 | N21 | W38 | 04 | 28.8 | | B | ESO | 190 | 23 | 14 | 3 |
| 8524 | | LEAR | 05 | 02 | 0106 | N22 | W42 | 04 | 28.9 | | BG | EAI | 160 | 29 | 15 | 3 |
| 8524 | | KAND | 05 | 02 | 0645 | N22 | W45 | 04 | 28.9 | | | EAO | | 14 | 13 | 2 |
| 8524 | | RAMY | 05 | 02 | 1258 | N21 | W48 | 04 | 29.0 | | BG | ESI | 120 | 19 | 12 | 3 |
| 8524 | | SVTO | 05 | 02 | 1443 | N21 | W54 | 04 | 28.6 | | B | DSO | 170 | 5 | 8 | 2 |
| 8524 | 29069 | MWIL | 05 | 02 | 1445 | N22 | W50 | 04 | 28.9 | 4 | (BG) | | | | | |
| 8524 | | LEAR | 05 | 03 | 0108 | N20 | W55 | 04 | 28.9 | | B | ESO | 160 | 8 | 11 | 3 |
| 8524 | | KAND | 05 | 03 | 0730 | N22 | W58 | 04 | 28.9 | | | CAO | | 10 | 13 | 3 |
| 8524 | | SVTO | 05 | 03 | 0809 | N21 | W63 | 04 | 28.6 | | B | DRO | 20 | 3 | 5 | 3 |
| 8524 | | RAMY | 05 | 03 | 1216 | N18 | W62 | 04 | 28.9 | | B | FSO | 70 | 9 | 18 | 4 |
| 8524 | 29069 | MWIL | 05 | 03 | 1830 | N23 | W65 | 04 | 28.9 | 4 | (BP) | | | | | |
| 8524 | | LEAR | 05 | 04 | 0204 | N20 | W69 | 04 | 28.9 | | B | ESO | 70 | 10 | 12 | 4 |
| 8524 | | SVTO | 05 | 04 | 0945 | N22 | W73 | 04 | 28.9 | | B | BXO | 10 | 2 | 4 | 3 |
| 8524 | | RAMY | 05 | 04 | 1259 | N23 | W72 | 04 | 29.1 | | B | BXO | 30 | 2 | 3 | 4 |
| 8524 | 29069 | MWIL | 05 | 04 | 1430 | N21 | W75 | 04 | 28.9 | 4 | (B ) | | | | | |
| 8524 | | HOLL | 05 | 04 | 1550 | N22 | W78 | 04 | 28.8 | | A | AX | 10 | 3 | 2 | 3 |
| 8522 | | LEAR | 04 | 23 | 0045 | N14 | E72 | 04 | 28.5 | | A | AX | | 1 | | 4 |
| 8522 | | HOLL | 04 | 23 | 1450 | N17 | E67 | 04 | 28.7 | | A | AX | 30 | 1 | 1 | 3 |
| 8522 | 29067 | MWIL | 04 | 23 | 1600 | N17 | E67 | 04 | 28.7 | 4 | (AP) | | | | | |
| 8522 | | LEAR | 04 | 24 | 0040 | N16 | E60 | 04 | 28.6 | | A | AX | 10 | 1 | | 5 |
| 8522 | | KAND | 04 | 24 | 0800 | N17 | E58 | 04 | 28.7 | | | BXO | | 2 | 2 | 4 |
| 8522 | | RAMY | 04 | 24 | 1152 | N17 | E58 | 04 | 28.9 | | B | BXO | 10 | 7 | 6 | 3 |
| 8522 | | SVTO | 04 | 24 | 1441 | N17 | E58 | 04 | 29.0 | | B | BXO | 20 | 2 | 5 | 2 |
| 8522 | | HOLL | 04 | 24 | 1900 | N16 | E54 | 04 | 28.9 | | B | CSO | 40 | 5 | 6 | 2 |
| 8522 | | LEAR | 04 | 25 | 0125 | N15 | E51 | 04 | 28.9 | | B | DSO | 70 | 7 | 6 | 3 |
| 8522 | | KAND | 04 | 25 | 0730 | N17 | E46 | 04 | 28.8 | | | CAO | | 7 | 6 | 3 |
| 8522 | | RAMY | 04 | 25 | 1116 | N18 | E44 | 04 | 28.8 | | B | DSO | 50 | 12 | 6 | 5 |
| 8522 | 29067 | MWIL | 04 | 25 | 1445 | N17 | E44 | 04 | 28.9 | 4 | (B ) | | | | | |
| 8522 | | HOLL | 04 | 25 | 1455 | N16 | E44 | 04 | 28.9 | | B | DSO | 70 | 7 | 6 | 3 |
| 8522 | | LEAR | 04 | 26 | 0137 | N15 | E37 | 04 | 28.9 | | B | DAO | 120 | 10 | 7 | 4 |
| 8522 | | SVTO | 04 | 26 | 0530 | N17 | E36 | 04 | 29.0 | | B | DAO | 40 | 5 | 7 | 3 |
| 8522 | | KAND | 04 | 26 | 0625 | N16 | E34 | 04 | 28.8 | | | DSO | | 5 | 9 | 4 |
| 8522 | | RAMY | 04 | 26 | 1128 | N17 | E32 | 04 | 28.9 | | B | DSO | 50 | 9 | 7 | 4 |
| 8522 | 29067 | MWIL | 04 | 26 | 1430 | N16 | E30 | 04 | 28.9 | 5 | (BP) | | | | | |
| 8522 | | HOLL | 04 | 26 | 1455 | N17 | E29 | 04 | 28.8 | | B | DSO | 60 | 8 | 6 | 3 |
| 8522 | | KAND | 04 | 27 | 0650 | N17 | E20 | 04 | 28.8 | | | CAO | | 2 | 7 | 3 |
| 8522 | 29067 | MWIL | 04 | 27 | 1445 | N17 | E16 | 04 | 28.8 | 5 | (B ) | | | | | |
| 8522 | | SVTO | 04 | 28 | 0740 | N19 | E08 | 04 | 28.9 | | B | DAO | 30 | 5 | 6 | 3 |
| 8522 | | KAND | 04 | 28 | 1110 | N15 | E06 | 04 | 28.9 | | | CAO | | 5 | 6 | 2 |
| 8522 | | RAMY | 04 | 28 | 1200 | N18 | E05 | 04 | 28.9 | | B | CSO | 20 | 4 | 6 | 4 |
| 8522 | | HOLL | 04 | 28 | 1504 | N17 | E04 | 04 | 28.9 | | B | CSO | 30 | 5 | 6 | 1 |
| 8522 | | LEAR | 04 | 29 | 0129 | N17 | W02 | 04 | 28.9 | | B | CSO | 30 | 10 | 6 | 4 |
| 8522 | | KAND | 04 | 29 | 0705 | N19 | W05 | 04 | 28.9 | | | CAO | | 7 | 5 | 4 |
| 8522 | | SVTO | 04 | 29 | 0715 | N18 | W05 | 04 | 28.9 | | B | CRO | 10 | 4 | 6 | 3 |
| 8522 | | RAMY | 04 | 29 | 1223 | N18 | W07 | 04 | 29.0 | | B | DSO | 40 | 8 | 5 | 3 |
| 8522 | | HOLL | 04 | 29 | 1444 | N17 | W10 | 04 | 28.8 | | B | CSO | 20 | 5 | 5 | 3 |
| 8522 | | LEAR | 04 | 30 | 0105 | N18 | W15 | 04 | 28.9 | | B | CSO | 30 | 6 | 6 | 4 |
| 8522 | | SVTO | 04 | 30 | 0747 | N21 | W23 | 04 | 28.6 | | B | DAO | 150 | 11 | 9 | 3 |
| 8522 | | HOLL | 04 | 30 | 1540 | N18 | W23 | 04 | 28.9 | | B | CRO | 30 | 6 | 5 | 3 |

# S U N S P O T  G R O U P S
## (Ordered by Central Meridian Passage Date)

## APRIL 1999

| NOAA/ USAF Group | Mt Wilson Group | Sta | Observation Time Mo Day (UT) | Lat CMD | CMP Mo Day | Max H | Mag Class | Spot Class | Corrected Area (10-6 Hemi) | Spot Count | Long. Extent (Deg) | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8524A | | KAND | 05 04 0700 | N14 W71 | 04 29.0 | | | AX | | 1 | 1 | 4 |
| 8526A | | SVTO | 04 23 1210 | N17 E73 | 04 29.0 | | A | AX | 10 | 1 | | 3 |
| 8526A | | HOLL | 04 24 1900 | N21 E56 | 04 29.1 | | B | BXO | 10 | 3 | 3 | 2 |
| 8523A | | SVTO | 05 02 1443 | N23 W45 | 04 29.2 | | B | DSO | 110 | 6 | 4 | 2 |
| 8523A | | SVTO | 05 03 0809 | N24 W54 | 04 29.3 | | B | DAO | 60 | 4 | 5 | 3 |
| 8523A | | KAND | 05 04 0700 | N23 W67 | 04 29.2 | | | BXO | | 3 | 7 | 4 |
| 8523A | | SVTO | 05 04 0945 | N25 W68 | 04 29.2 | | A | AX | 10 | 1 | | 3 |

Stations reporting:

HOLL = Holloman
KAND = Kandilli
LEAR = Learmonth
MWIL = Mt. Wilson
PALE = Palehua
RAMY = Ramey
SVTO = San Vito
TACH = Tashkent
VORO = Voroshilov

APRIL 1999

| Day | Start (UT) | Max (UT) | End (UT) | Imp | Wide Spread Index | Number of Station Reports by Type SWF | SEA | SPA | LF-SPA | LF-SES | Flare (UT) | X-ray Class | NOAA Region |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 0639 | 0645 | 0702 | 1 | 1 | | 1 | | | | No flare | | |
| 01 | 1418 | 1426 | 1514 | 1 | 1 | | 1 | | | | No flare | | |
| 01 | 1523 | 1531 | 1550 | 1 | 1 | | 1 | | | | No flare | | |
| 02 | 0735 | 0748 | 0807 | 1 | 3 | | 2 | | | | No flare | | |
| 02 | 0810 | 0817 | 0840 | 3 | 5 | 1 | 4 | 1 | | 1 | 0806 | M1.1 | |
| 02 | 1451 | 1501 | 1515 | 1 | 1 | | 1 | | | | No flare | | |
| 02 | 1526 | 1539 | 1556 | 1 | 3 | | 2 | | | | 1526 | B4.3 | |
| 02 | 1612 | 1618 | 1631 | 1- | 5 | | 1 | | | 1 | 1618 | B6.2 | |
| 03 | 1342 | 1344 | 1402 | 1- | 3 | | | | | 3 | 1339 | C1.4 | 8506 |
| 03 | 1455 | 1500 | 1529 | 1+ | 3 | | | | | 3 | 1452 | C1.9 | 8507 |
| 03 | 2046 | 2053 | 2139 | 2 | 3 | | | | | 2 | 2044 | C3.1 | 8506 |
| 03 | 2145 | 2205 | 2230 | 2 | 1 | | | | | 1 | 2145 | | 8504 |
| 03 | 2220 | 2222 | 2238 | 1- | 1 | | | | | 1 | 2216 | C2.8 | 8506 |
| 03 | 2301 | 2309 | 2356 | 2 | 3 | | | | | 2 | 2256 | M4.3 | 8508 |
| 04 | 0514 | 0517 | 0533 | 1- | 3 | | 1 | | | 1 | 0515 | M5.4 | 8508 |
| 04 | 0520 | 0529 | 0619 | 3- | 3 | | 2 | | | | 0515 | M5.4 | 8508 |
| 04 | 1041 | 1055 | 1122 | 1 | 3 | | 2 | | | | No flare | | |
| 04 | 1231 | 1247 | 1305 | 1 | 1 | | 1 | | | | No flare | | |
| 04 | 2150 | 2152 | 2215 | 1 | 1 | | | | | 1 | 2147 | C2.3 | |
| 05 | 1914 | 1916 | 1941 | 1 | 3 | | | | | 3 | 1909 | C2.6 | |
| 05 | 2308 | 2311 | 2339 | 1+ | 1 | | | | | 1 | 2301 | C3.3 | 8506 |
| 06 | 0646 | 0734 | 1058 | 2+ | 3 | | 2 | | | | 0652 | C3.5 | 8508 |
| 06 | 1455 | 1457 | 1520 | 1 | 1 | | 1 | | | | 1450 | | 8507 |
| 07 | 0637 | 0830 | 1002U | 2 | 1 | | 1 | | | | No flare | | |
| 07 | 0914 | 0920 | 0933 | 1 | 1 | | 1 | | | | 0920 | C1.3 | 8508 |
| 07 | 0936 | 0937 | 0953 | 1 | 1 | | 1 | | | | No flare | | |
| 07 | 1107 | 1122 | 1148 | 1 | 1 | | 1 | | | | No flare | | |
| 07 | 1152 | 1205 | 1219 | 1 | 1 | | 1 | | | | No flare | | |
| 07 | 1226 | 1236 | 1327 | 1 | 1 | | 1 | | | | 1234 | | 8509 |
| 07 | 1328 | 1334 | 1347 | 1 | 1 | | 1 | | | | 1325 | | 8508 |
| 07 | 1406 | 1424U | 1515 | 1 | 1 | | 1 | | | | 1411 | | 8511 |
| 07 | 1529 | 1536 | 1605 | 1 | 3 | | 1 | | | 1 | No flare | | |
| 08 | 0452 | 0459 | 0547 | 2 | 1 | | 1 | | | | 0511 | C2.1 | 8508 |
| 08 | 0838 | 0841 | 0845 | 3 | 5 | 1 | 3 | 1 | | | 0836 | C6.9 | 8508 |
| 08 | 1258 | 1400 | 1441 | 1 | 1 | | 1 | | | | 1326 | B9.1 | |
| 08 | 1609 | 1611 | 1615 | 3- | 5 | | 3 | 1 | | 4 | 1607 | M1.1 | 8508 |
| 08 | 1719 | 1722 | 1739 | 1+ | 3 | | | | | 2 | 1714 | C3.4 | 8508 |
| 09 | 1237 | 1243 | 1510 | 1 | 1 | | 1 | | | | No flare | | |
| 13 | 1747 | 1753 | 1832 | 2 | 3 | | | | | 2 | 1742 | C1.9 | |
| 15 | 0605 | 0607 | 0621 | 1 | 1 | | 1 | | | | * | | |
| 15 | 1532 | 1541 | 1555 | 1 | 1 | | 1 | | | | No flare | | |
| 15 | 1556 | 1600 | 1622 | 1 | 1 | | 1 | | | | 1547 | B8.5 | |
| 16 | 1124 | 1139 | 1151 | 1 | 3 | | 2 | | | | No flare | | |
| 16 | 1523 | 1529 | 1608 | 1 | 3 | | 2 | | | | No flare | | |
| 16 | 1654 | 1656 | 1730 | 1 | 1 | | 1 | | | | No flare | | |
| 18 | 0855 | 0910 | 0930 | 1 | 1 | | 1 | | | | No flare | | |
| 18 | 1010 | 1019 | 1042 | 1 | 1 | | 1 | | | | No flare | | |
| 19 | 0724 | 0800 | 0825 | 1+ | 3 | | 2 | | | | No flare | | |
| 22 | 1127 | 1130 | 1146 | 1 | 1 | | 1 | | | | No flare | | |
| 22 | 1525 | 1528 | 1605 | 1 | 1 | | 1 | | | | No flare | | |
| 22 | 1700 | 1710 | 1732 | 1+ | 1 | | 1 | | | | No flare | | |
| 23 | 1549 | 1554U | 1626 | 1 | 1 | | 1 | | | | No flare | | |

* = no flare patrol.

# SUDDEN IONOSPHERIC DISTURBANCES

## APRIL 1999

| Day | Start (UT) | Max (UT) | End (UT) | Imp | Wide Spread Index | Number of Station Reports by Type SWF | SEA | SPA | LF-SPA | SES | Flare (UT) | X-ray Class | NOAA Region |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 1915 | 1917 | 2015 | 2* | 1 | | | | | 1 | 1910 | | 8522 |
| 25 | 1226 | 1228 | 1243 | 1- | 1 | | | | | 1 | 1226 | B5.2 | 8524 |
| 27 | 2021 | 2026 | 2058 | 2- | 3 | | | | | 5 | 2020 | C1.3 | |
| 28 | 1505 | 1507 | 1515 | 1- | 1 | | | | | 1 | 1508 | B7.8 | |
| 28 | 1902 | 1905 | 1922 | 1 | 1 | | | | | 1 | 1904 | B8.2 | |
| 28 | 2031 | 2033 | 2120 | 2 | 3 | | | | | 5 | 2027 | C3.8 | |
| 29 | 0825 | 0830 | 0840 | 1- | 1 | | | | | 1 | 0825 | C2.5 | 8525 |
| 29 | 1155 | 1210 | 1230 | 1 | 1 | | | | | 1 | 1156 | C1.3 | 8524 |
| 29 | 1537 | 1544 | 1607 | 1* | 5 | | | | | 4 | 1537 | C1.7 | 8524 |
| 29 | 1711 | 1716 | 1732 | 1- | 5 | | | | | 4 | 1711 | C2.9 | 8524 |
| 29 | 1734 | 1740 | 1816 | 1* | 5 | | | | | 4 | 1734 | C3.7 | 8524 |
| 29 | 1948 | 1952 | 2043 | 2 | 3 | | | | | 5 | 1945 | M1.1 | 8524 |
| 29 | 2051E | 2054 | 2118 | 1* | 1 | | | | | 1 | 2047 | C1.5 | 8524 |
| 30 | 0712 | 0719 | 0743 | 1* | 1 | | 1 | | | | No flare | | |
| 30 | 1213 | 1217 | 1232 | 3 | 5 | | 3 | 1 | | 5 | 1210 | C8.2 | 8524 |

* = no flare patrol.

## OBSERVATORIES REPORTING FOR APRIL 1999

| | | | |
|---|---|---|---|
| Cambridge, England, UK | SES | Rochester, New Hampshire, USA | SES |
| Columbia City, Indiana, USA | SES | Seattle, Washington, USA | SES |
| Edenvale, Rep of S. Africa | SES | Sun City Center, FL, USA | SES |
| Houston, Texas, USA | SES | Tucson, Arizona, USA | SES |
| Hudson, Ohio, USA | SES | Upice, Czech Republic | SEA |
| Koniz, Switzerland | SES | Vlasim, Czech Republic | SEA |
| Panska Ves, Czech Republic | SES, SEA, SWF | Zilina, Slovakia | SEA |
| Rimavska Sobota, Slovakia | SEA | | |

Observations are not necessarily continuous.

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| Day | OBSERVATION Start (UT) | OBSERVATION End (UT) | Sta | EVENT Start (UT) | EVENT End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | FREQUENCY Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 0000 | 0905 | HIRA | | | | | | | | |
| | | | PALE | 0010.0 | 0010.0 | III | | 1 | 27 | 54 | |
| | 0000 | 0800 | CULG | 0010.0 | 0011.0 | III | G | 1 | 23 | 90 | |
| | | | CULG | 0159.0 | 0159.0 | III | B | 1 | 25 | 80 | |
| | | | CULG | 0217.0 | 0217.0 | III | B | 2 | 23 | 80 | |
| | | | PALE | 0217.0 | 0224.0 | III | | 2 | 30 | 60 | |
| | | | CULG | 0223.0 | 0225.0 | III | G | 2 | 23 | 80 | |
| | 0518 | 1641 | POTS | 0505.7 | 0550.8 | III | B | 1 | 200U | 250 | 40-90 MHz no obs |
| | 0547 | 1623 | ONDR | | | | | | | | |
| | 0557 | 1104 | IZMI | | | | | | | | |
| | | | POTS | 0706.2 | 0706.6 | III | G | 1 | 110U | 170U | |
| | | | POTS | 0755 | 0958 | I | S | 1 | 150 | 170U | |
| | | | POTS | 1123.5 | 1123.6 | III | B | 1 | 110U | 150 | |
| | | | POTS | 1130.4 | 1130.7 | UNCLF | | 2 | 110U | 145 | |
| | | | POTS | 1150 | 1312 | I | S | 1 | 110U | 170U | |
| | | | POTS | 1424 | 1641 U | I | S | 1 | 110U | 170U | |
| | | | SGMR | 1604.0 | 1609.0 | III | | 1 | 30 | 50 | |
| | 2018 | 2400 | HIRA | | | | | | | | |
| | 2035 | 2400 | CULG | 2050.0 | 2053.0 | III | G | 1 | 25 | 100 | |
| | | | PALE | 2051.0 | 2053.0 | III | | 1 | 27 | 56 | |
| | | | SGMR | 2051.0 | 2051.0 | III | | 1 | 30 | 50 | |
| | | | SGMR | 2051.0 | 2051.0 | III | | 1 | 30 | 55 | |
| | | | CULG | 2142.0 | 2142.0 | III | B | 1 | 25 | 70 | |
| 02 | 0000 | 0905 | HIRA | | | | | | | | |
| | 0000 | 0800 | CULG | 0233.0 | 0233.0 | III | B | 1 | 25 | 90 | |
| | | | CULG | 0340.0 | 0340.0 | III | B | 1 | 23 | 100 | |
| | | | CULG | 0508.0 | 0508.0 | III | B | 1 | 23 | 70 | |
| | 0545 | 1624 | ONDR | | | | | | | | |
| | 0518 | 1641 | POTS | 0600 | 0943 | I | S | 1 | 110U | 170U | 40-90 MHz no obs |
| | | | CULG | 0601.0 | 0605.0 | III | G | 1 | 25 | 140 | |
| | | | POTS | 0601.0 | 0601.2 | UNCLF | | 2 | 110U | 135 | |
| | 0601 | 1200 | IZMI | 0601.0 | 0601.2 | III | B | 1 | 45X | 95 | |
| | | | SVTO | 0603.0 | 0605.0 | III | | 1 | 36 | 59 | |
| | | | IZMI | 0604.0 | 0604.8 | III | G | 2 | 45X | 100 | |
| | | | SVTO | 0745.0 | 0745.0 | III | | 1 | 35 | 51 | |
| | | | POTS | 0745.4 | 0745.6 | III | G | 2 | 110U | 170U | |
| | | | POTS | 0809.3 | 0815.3 | III | GG,RS,U | 3 | 110U | 170U | |
| | | | IZMI | 0809.6 | 0810.1 | III | G | 2 | 110 | 170 | |
| | | | IZMI | 0811.5 | 0814.1 | III | GG | 2 | 45X | 200 | |
| | | | SVTO | 0812.0 | 0814.0 | V | | 2 | 35 | 84 | |
| | 0923 | 1144 | IZMI | | | | | | | | |
| | | | POTS | 0941.3 | 0942.5 | III | G | 1 | 110U | 170U | |
| | | | POTS | 1002.7 | 1002.9 | III | G | 2 | 110U | 250 | |
| | | | POTS | 1012.3 | 1012.6 | DCIM | | 1 | 325 | 600 | |
| | | | POTS | 1024.7 | 1024.8 | III | B | 1 | 110U | 170U | |
| | | | POTS | 1151.8 | 1154.8 | III | G | 1 | 110U | 170U | |
| | | | POTS | 1428.7 | 1428.9 | UNCLF | | 1 | 110U | 145 | |
| | | | SGMR | 1542.0 | 1543.0 | III | | 1 | 30 | 60 | |
| | | | SVTO | 1542.0 | 1543.0 | III | | 2 | 36 | 58 | |
| | | | SGMR | 1604.0 | 1609.0 | III | | 1 | 30 | 50 | |
| | | | PALE | 2001.0 | 2003.0 | III | | 1 | 31 | 36 | |
| | 2017 | 2400 | HIRA | | | | | | | | |
| | | | SGMR | 2050.0 | 2051.0 | III | | 1 | 30 | 50 | |
| | | | PALE | 2051.0 | 2051.0 | III | | 1 | 28 | 48 | |
| | 2035 | 2400 | CULG | 2051.0 | 2051.0 | III | B | 1 | 28 | 70 | |
| | | | CULG | 2209.0 | 2210.0 | III | G | 1 | 25 | 80 | |
| | | | CULG | 2257.0 | 2259.0 | III | G | 1 | 20 | 100 | |
| | | | PALE | 2257.0 | 2301.0 | III | | 1 | 25 | 75 | |
| 03 | 0000 | 0800 | CULG | 0515.0 | 0515.0 | III | B | 1 | 20 | 180 | |
| | 0518 | 1641 | POTS | 0520.4 | 0520.9 | III | G,U | 2 | 110U | 170U | 40-90 MHz no obs |
| | | | POTS | 0541.2 | 0541.8 | III | G,RS | 2 | 110U | 750 | |
| | 0000 | 0906 | HIRA | 0541.5 | 0541.6 | III | B | 1 | 150 | 320 | |
| | | | CULG | 0542.0 | 0542.0 | III | B | 1 | 90 | 300 | |
| | 0543 | 1626 | ONDR | | | | | | | | |
| | | | POTS | 0627 | 0628 | I | W | 1 | 150 | 170U | |
| | | | POTS | 0647.8 | 0652.1 | III | G | 2 | 110U | 170U | |
| | 0546 | 1200 | IZMI | 0648.4 | 0648.8 | III | G | 1 | 95 | 245 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| OBSERVATION Day | Start (UT) | End (UT) | Sta | EVENT Start (UT) | End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 03 | | | IZMI | 0652.0 | 0652.1 | III | B | 1 | 85 | 165 | |
| | | | POTS | 0738.6 | 0738.7 | III | G | 1 | 140 | 170U | |
| | | | POTS | 0802.9 | 0803.1 | III | B | 2 | 110U | 140 | |
| | | | IZMI | 0816.9 | 0818.4 | III | GG | 2 | 45X | 245 | |
| | | | POTS | 0816.9 | 0818.2 | III | G | 3 | 110U | 250 | |
| | | | SVTO | 0817.0 | 0818.0 | III | | 2 | 35 | 85 | |
| | | | HIRA | 0817.4 | 0818.2 | III | G | 2 | 50 | 200 | |
| | | | POTS | 0905 | 1542 | III | N | 1 | 110U | 170U | |
| | | | IZMI | 0949.0 | 0949.2 | III | B | 1 | 50 | 165 | |
| | | | POTS | 0949.0 | 0949.1 | III | B | 2 | 110U | 170U | |
| | | | POTS | 0958.0 | 1006.4 | III | GG,U | 2 | 110U | 250 | |
| | | | IZMI | 0958.1 | 0958.3 | III | G | 1 | 80 | 125 | |
| | | | IZMI | 0959.1 | 0959.9 | III | G | 1 | 105 | 245 | |
| | | | IZMI | 1002.3 | 1002.9 | III | G | 1 | 105 | 160 | |
| | | | IZMI | 1005.4 | 1006.3 | III | G | 2 | 45 | 220 | |
| | | | IZMI | 1011.7 | 1012.0 | III | B | 1 | 45 | 90 | |
| | | | IZMI | 1013.7 | 1014.1 | III | G | 1 | 45X | 160 | |
| | | | POTS | 1013.7 | 1015.3 | III | G | 2 | 110U | 170U | |
| | | | IZMI | 1014.8 | 1015.4 | III | G,FS | 2 | 45X | 175 | |
| | | | POTS | 1045 | 1057 | I | S,C | 2 | 110U | 250 | |
| | | | IZMI | 1045.6 | 1046.2 | III | G | 1 | 45X | 245 | |
| | | | SVTO | 1222.0 | 1224.0 | III | | 2 | 35 | 63 | |
| | | | POTS | 1222.1 | 1223.8 | III | G | 2 | 110U | 250 | |
| | | | SGMR | 1223.0 | 1223.0 | III | | 1 | 30 | 58 | |
| | | | POTS | 1231.1 | 1236.0 | III | G,U | 2 | 110U | 250 | |
| | | | POTS | 1312.5 | 1312.8 | UNCLF | | 2 | 110U | 250 | |
| | | | POTS | 1339.9 | 1343.6 | III | G | 2 | 110U | 360 | |
| | | | SVTO | 1353.0 | 1354.0 | III | | 1 | 49 | 66 | |
| | | | POTS | 1353.6 | 1354.1 | UNCLF | | 2 | 110U | 130 | |
| | | | POTS | 1453.3 | 1457.6 | III | G | 2 | 110U | 360 | |
| | | | SGMR | 1455.0 | 1455.0 | III | | 1 | 30 | 53 | |
| | | | SVTO | 1455.0 | 1455.0 | III | | 1 | 35 | 45 | |
| | | | PALE | 2024.0 | 2059.0 | III | N | 1 | 25U | 75U | |
| | 2035 | 2400 | CULG | 2040.0 | 2040.0 | III | B | 1 | 25 | 70 | |
| | | | CULG | 2046.0 | 2052.0 | III | G | 2 | 30 | 180 | |
| | 2015 | 2400 | HIRA | 2048.2 | 2048.6 | III | B | 2 | 50 | 220 | |
| | | | CULG | 2056.0 | 2059.0 | III | G | 1 | 28 | 90 | |
| | | | CULG | 2145.0 | 2145.0 | III | B | 1 | 23 | 50 | |
| | | | CULG | 2304.0 | 2304.0 | III | B | 2 | 35 | 90 | |
| | | | HIRA | 2306.5 | 2315.0 | II | | 2 | 80 | 180 | ESS 500 |
| | | | CULG | 2307.0 | 2317.0 | II | SH,H | 2 | 40 | 180 | SWF ESS 400 |
| | | | CULG | 2308.0 | 2317.0 | II | FN,H | 2 | 18 | 90 | |
| | | | PALE | 2312.0 | 2317.0 | III | | 2 | 25 | 60 | |
| | | | CULG | 2326.0 | 2335.0 | II | FN | 1 | 40 | 180 | |
| | | | HIRA | 2326.5 | 2335.5 | II | | 1 | 80 | 160 | ESS 450 |
| | | | CULG | 2328.0 | 2345.0 | II | SH | 1 | 50 | 180 | ESS 500 |
| 04 | 0000 | 0800 | CULG | 0135.0 | 0138.0 | III | G | 1 | 20 | 90 | |
| | | | CULG | 0242.0 | 0245.0 | III | G | 2 | 30 | 140 | |
| | 0000 | 0907 | HIRA | 0242.2 | 0242.3 | III | B | 1 | 50 | 140 | |
| | | | PALE | 0243.0 | 0244.0 | III | | 1 | 40 | 75 | |
| | | | CULG | 0355.0 | 0401.0 | III | G | 1 | 35 | 180 | |
| | | | CULG | 0415.0 | 0427.0 | II | FN | 1 | 20 | 50 | |
| | | | CULG | 0416.0 | 0435.0 | II | SH | 2 | 23 | 100 | ESS 650 |
| | | | PALE | 0420.0 | 0423.0 | II | | 1 | 45 | 60 | ESS 0600 |
| | | | CULG | 0439.0 | 0442.0 | III | G | 1 | 25 | 80 | |
| | | | SVTO | 0508.0 | 0510.0 | III | | 1 | 58 | 85 | |
| | | | CULG | 0509.0 | 0510.0 | III | G | 2 | 40 | 270 | SWF |
| | | | HIRA | 0509.0 | 0510.0 | III | G | 2 | 50 | 260 | |
| | | | POTS | 0518 E | 1640 | III | N | 1 | 110U | 170U | |
| | 0518 | 1641 | POTS | 0518 E | 1641 U | I | S,C | 2 | 110U | 500 | 40-90 MHz no obs |
| | | | CULG | 0518.0 | 0526.0 | III | G | 3 | 18X | 180 | |
| | | | SVTO | 0520.0 | 0531.0 | III | N | 3 | 35 | 85 | |
| | | | HIRA | 0520.5 | 0524.0 | III | G | 3 | 30 | 170 | |
| | | | POTS | 0520.6 | 0523.3 | III | GG | 3 | 110U | 300 | |
| | | | CULG | 0529.0 | 0533.0 | III | G | 1 | 30 | 160 | |
| | | | POTS | 0531.2 | 0532.8 | III | G | 2 | 110U | 170U | |
| | 0540 | 1627 | ONDR | | | | | | | | |
| | 0606 | 1200 | IZMI | 0642.9 | 0643.0 | III | B | 1 | 45X | 90 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| Day | OBSERVATION Start (UT) | OBSERVATION End (UT) | Sta | EVENT Start (UT) | EVENT End (UT) | EVENT Spectral Class | EVENT Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | FREQUENCY Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 04 | | | POTS | 0805.7 | 0806.2 | III | G | 2 | 110U | 225 | |
| | | | POTS | 0816.8 | 0817.7 | III | G | 1 | 140 | 375 | |
| | | | POTS | 0903.6 | 0916.0 | III | GG,U | 2 | 110U | 250 | |
| | | | IZMI | 0915.6 | 0915.7 | III | B | 2 | 105 | 165 | |
| | | | IZMI | 0920.7 | 1200.0D | I | N | 1 | 90 | 245 | |
| | | | POTS | 1109.5 | 1110.0 | III | G | 2 | 110U | 225 | |
| | | | IZMI | 1155.2 | 1155.3 | III | B | 2 | 110 | 175 | |
| | | | POTS | 1155.2 | 1155.4 | III | B | 2 | 110U | 170U | |
| | | | POTS | 1403.9 | 1408.9 | III | GG,C,RS | 2 | 110U | 300U | |
| | | | SGMR | 1405.0 | 1406.0 | V | | 1 | 30 | 62 | |
| | | | SVTO | 1405.0 | 1406.0 | III | | 2 | 35 | 60 | |
| | | | POTS | 1420.3 | 1420.6 | III | G | 2 | 110U | 250 | |
| | | | POTS | 1452.3 | 1501.1 | III | GG | 2 | 110U | 400 | |
| | | | SGMR | 1456.0 | 1456.0 | III | | 1 | 30 | 47 | |
| | | | PALE | 1919.0 | 1920.0 | III | | 1 | 25 | 75 | |
| | | | SGMR | 1919.0 | 1919.0 | III | | 1 | 30 | 60 | |
| | 2035 | 2400 | CULG | 2037.0 | 2112.0 | III | N | 1 | 25 | 80 | |
| | | | CULG | 2148.0 | 2154.0 | III | G | 1 | 20 | 80 | |
| | | | PALE | 2148.0 | 2154.0 | III | | 2 | 25 | 75 | |
| | 2013 | 2400 | HIRA | 2149.0 | 2153.0 | III | G | 1 | 25X | 140 | |
| 05 | 0000 | 0800 | CULG | 0451.0 | 0453.0 | III | G | 1 | 50 | 90 | |
| | 0518 | 1641 | POTS | 0518 E | 1641 U | I | S | 2 | 110U | 400 | 40-90MHz no obs |
| | | | SVTO | 0530.0 | 0531.0 | III | | 1 | 35 | 85 | |
| | | | POTS | 0530.9 | 0531.5 | III | G | 2 | 110U | 160 | |
| | | | CULG | 0531.0 | 0532.0 | III | G | 1 | 25 | 90 | |
| | 0000 | 0908 | HIRA | 0531.4 | 0531.6 | III | B | 1 | 50 | 120 | |
| | 0538 | 1628 | ONDR | | | | | | | | |
| | | | POTS | 0608 | 1641 U | III | N | 1 | 110U | 170U | |
| | 0600 | 1200 | IZMI | 0630.9 | 0631.2 | III | G | 2 | 90 | 175 | |
| | | | POTS | 0631.0 | 0631.3 | III | G | 2 | 110U | 170U | |
| | | | IZMI | 0702.0U | 0725.0U | I | N | 1 | 230 | 270 | |
| | | | IZMI | 0736.3 | 0737.2 | III | G | 2 | 55 | 270X | |
| | | | POTS | 0736.3 | 0736.9 | DCIM | | 2 | 200U | 375 | |
| | | | POTS | 0736.8 | 0740.8 | III | G,U | 3 | 110U | 170U | |
| | | | SVTO | 0737.0 | 0737.0 | III | | 1 | 69 | 81 | |
| | | | IZMI | 0738.3 | 0738.4 | III | B | 2 | 45X | 95 | |
| | | | IZMI | 0739.8 | 0740.2 | UNCLF | | 2 | 120 | 160 | |
| | | | IZMI | 0820.1 | 0820.2 | III | B | 2 | 45 | 170 | |
| | | | POTS | 0820.1 | 0820.2 | III | B | 3 | 110U | 170U | |
| | | | SVTO | 0828.0 | 0831.0 | III | | 2 | 35 | 85 | |
| | | | IZMI | 0828.6 | 0831.7 | III | GG | 2 | 45X | 145 | |
| | | | POTS | 0828.8 | 0831.8 | III | G,U | 2 | 110U | 170U | |
| | | | HIRA | 0829.0 | 0831.0 | III | G | 1 | 50 | 100 | |
| | | | IZMI | 0857.2 | 0857.3 | III | G | 1 | 120 | 160 | |
| | | | POTS | 0857.2 | 0857.5 | III | G | 2 | 125 | 160 | |
| | | | SVTO | 1207.0 | 1210.0 | III | | 2 | 35 | 55 | |
| | | | SGMR | 1208.0 | 1216.0 | III | | 1 | 30 | 60 | |
| | | | SGMR | 1259.0 | 1349.0 | III | N | 1 | 30 | 80 | |
| | | | SVTO | 1259.0 | 1312.0 | III | N | 2 | 35 | 76 | |
| | | | POTS | 1259.7 | 1259.9 | III | G | 2 | 110U | 170U | |
| | | | POTS | 1312.1 | 1312.4 | III | G | 2 | 110U | 170U | |
| | | | POTS | 1313.6 | 1313.8 | III | G | 2 | 110U | 170U | |
| | | | SVTO | 1348.0 | 1349.0 | III | | 1 | 35 | 76 | |
| | | | POTS | 1348.6 | 1348.8 | III | B | 2 | 110U | 170U | |
| | | | POTS | 1427.9 | 1434.0 | III | GG | 2 | 110U | 225 | |
| | | | SGMR | 1428.0 | 1433.0 | III | | 1 | 30 | 80 | |
| | | | SGMR | 1526.0 | 1527.0 | III | | 1 | 30 | 55 | |
| | | | POTS | 1617.5 | 1620.7 | III | G | 2 | 110U | 500 | |
| | | | PALE | 1856.0 | 1858.0 | III | | 1 | 25 | 60 | |
| | | | SGMR | 1910.0 | 1912.0 | III | | 1 | 30 | 80 | |
| | | | PALE | 1911.0 | 1913.0 | III | | 1 | 25 | 60 | |
| | | | SGMR | 1944.0 | 1954.0 | III | | 1 | 30 | 80 | |
| | | | PALE | 1945.0 | 1955.0 | III | N | 2 | 25 | 75 | |
| | 2012 | 2400 | HIRA | | | | | | | | |
| | | | PALE | 2030.0 | 2038.0 | III | | 1 | 25 | 40 | |
| | | | PALE | 2343.0 | 2344.0 | III | | 1 | 28 | 42 | |
| 06 | 0000 | 0909 | HIRA | | | | | | | | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| OBSERVATION Start (UT) | End (UT) | Sta | EVENT Start (UT) | End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 06 | | PALE | 0101.0 | 0101.0 | III | | 1 | 43 | 52 | |
| | | PALE | 0156.0 | 0156.0 | III | | 1 | 45 | 57 | |
| 0518 | 1641 | POTS | 0518 E | 1641 U | I | S,C | 2 | 110U | 380 | 40-90 MHz no obs |
| 0536 | 1628 | ONDR | | | | | | | | |
| | | POTS | 0547 | 1529 | III | N | 1 | 110U | 170U | |
| | | POTS | 0548.8 | 0549.3 | DCIM | | 1 | 350 | 700 | |
| 0600 | 1200 | IZMI | 0600.0E | 0849.0U | I | S | 1 | 100 | 135 | |
| | | IZMI | 0601.1 | 0601.6 | III | G | 1 | 45X | 60 | |
| | | POTS | 0608.5 | 0609.2 | DCIM | U | 2 | 400 | 600 | |
| | | IZMI | 0638.9 | 0639.2 | III | B | 1 | 45X | 90 | |
| | | POTS | 0644.4 | 0645.0 | DCIM | | 1 | 450 | 620 | |
| | | IZMI | 0711.8 | 0711.9 | III | B | 1 | 45 | 90 | |
| | | SVTO | 0749.0 | 0750.0 | III | | 2 | 35U | 79U | |
| | | IZMI | 0749.7 | 0750.4 | III | G | 2 | 45X | 145 | |
| | | POTS | 0749.8 | 0752.1 | III | G | 2 | 110U | 170U | |
| | | POTS | 0757.8 | 0757.9 | III | B | 2 | 110U | 170U | |
| | | IZMI | 0850.0U | 1200.0D | I | S | 1 | 100 | 270X | |
| | | IZMI | 0916.7 | 0917.4 | III | G | 2 | 45X | 175 | |
| | | POTS | 0916.7 | 0916.9 | III | B | 2 | 110U | 170U | |
| | | POTS | 0936.0 | 0943.2 | DCIM | | 2 | 370 | 800X | |
| | | IZMI | 1053.3 | 1055.4 | III | G | 2 | 45X | 180 | |
| | | POTS | 1053.3 | 1055.1 | III | G | 2 | 110U | 170U | |
| | | POTS | 1119.5 | 1119.6 | III | B | 2 | 110U | 160 | |
| 2011 | 2400 | HIRA | | | | | | | | |
| 2130 | 2400 | CULG | 2212.0 | 2212.0 | III | B | 1 | 30 | 50 | |
| 07 | 0000 | 0910 | HIRA | | | | | | | |
| 0000 | 0755 | CULG | 0440.0 | 0601.0 | III | N | 1 | 20 | 90 | |
| 0518 | 1641 | POTS | 0518 E | 1641 U | I | S,C,DC | 2 | 110U | 500 | 40-90 MHz no obs |
| 0534 | 1632 | ONDR | | | | | | | | |
| 0546 | 1200 | IZMI | 0546.0E | 1200.0D | I | S | 1 | 45X | 270X | |
| | | SVTO | 0600.0 | 0605.0 | III | | 2 | 35 | 85 | |
| | | IZMI | 0600.5 | 0600.7 | III | G | 2 | 45X | 135 | |
| | | POTS | 0600.8 | 0600.9 | UNCLF | | 1 | 370 | 650 | |
| | | SVTO | 0601.0 | 1218.0 | CONT | | 2 | 35 | 85 | |
| | | IZMI | 0602.0 | 1200.0D | III | N | 1 | 45X | 135 | |
| | | POTS | 0708.8 | 0711.0 | DCIM | | 2 | 500 | 800X | |
| | | CULG | 0709.0 | 0712.0 | III | G | 1 | 35 | 80 | |
| | | IZMI | 0712.0 | 0713.5 | I | GG,DC | 2 | 80 | 95 | |
| | | IZMI | 0712.2 | 0712.7 | III | G | 2 | 45X | 85 | |
| | | IZMI | 1006.3 | 1009.0 | III | GG | 2 | 45X | 140 | |
| | | SGMR | 1102.0 | 1103.0 | III | | 1 | 30 | 60 | |
| | | IZMI | 1102.7 | 1103.5 | III | GG | 2 | 45X | 160 | |
| | | POTS | 1102.7 | 1103.2 | III | G | 2 | 110U | 325 | |
| | | POTS | 1116.7 | 1116.9 | DCIM | | 1 | 350 | 500 | |
| | | SGMR | 1249.0 | 1252.0 | III | | 1 | 30 | 80 | |
| | | SVTO | 1249.0 | 1252.0 | III | | 2 | 35 | 85 | |
| | | POTS | 1249.6 | 1252.1 | III | G | 3 | 110U | 300 | |
| | | POTS | 1324.9 | 1325.0 | DCIM | | 2 | 500 | 650 | |
| | | SVTO | 1352.0 | 1353.0 | III | | 2 | 35 | 85 | |
| 2035 | 2400 | CULG | 2042.0 | 2050.0 | III | N | 1 | 30 | 140 | |
| | | CULG | 2123.0 | 2400.0D | I | S | 1 | 60 | 160 | |
| | | SGMR | 2149.0 | 2151.0 | III | | 3 | 30 | 80 | |
| | | PALE | 2151.0 | 2152.0 | III | | 1 | 25 | 75 | |
| | | CULG | 2152.0 | 2152.0 | III | B | 2 | 25 | 180 | |
| | | CULG | 2211.0 | 2212.0 | III | B | 2 | 23 | 180 | |
| | | PALE | 2211.0 | 2212.0 | III | | 1 | 25 | 75 | |
| | | SGMR | 2211.0 | 2212.0 | III | | 1 | 30 | 80 | |
| 2009 | 2400 | HIRA | 2211.6 | 2211.8 | III | B | 2 | 30 | 220 | |
| 08 | 0000 | 0750 | CULG | 0000.0E | 0345.0 | I | S | 1 | 60 | 160 |
| | | PALE | 0023.0 | 0031.0 | III | | 3 | 25 | 70 | |
| | | CULG | 0024.0 | 0028.0 | III | GG | 2 | 18X | 180 | |
| | | CULG | 0329.0 | 0329.0 | III | B | 1 | 30 | 75 | |
| | | PALE | 0350.0 | 0354.0 | III | | 1 | 25 | 75 | |
| | | CULG | 0351.0 | 0354.0 | III | G | 3 | 18X | 240 | |
| 0000 | 0910 | HIRA | 0351.5 | 0354.0 | III | G | 2 | 25X | 200 | |
| | | CULG | 0358.0 | 0358.0 | III | B | 2 | 23 | 180 | |
| | | HIRA | 0358.0 | 0358.2 | III | B | 2 | 50 | 220 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| OBSERVATION Start (UT) | OBSERVATION End (UT) | Sta | EVENT Start (UT) | EVENT End (UT) | EVENT Spectral Class | EVENT Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | FREQUENCY Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 08 | | CULG | 0413.0 | 0415.0 | III | G | 1 | 30 | 100 | |
| | | CULG | 0455.0 | 0456.0 | III | G | 1 | 20 | 100 | |
| 0518 | 1641 | POTS | 0518 E | 1641 U | I | S,C,DC | 2 | 110U | 350 | 40-90 MHz no obs |
| | | CULG | 0601.0 | 0601.0 | III | B | 2 | 20 | 180 | |
| | | SVTO | 0601.0 | 0601.0 | III | | 2 | 35 | 85 | |
| 0601 | 1200 | IZMI | 0601.0E | 1200.0D | I | S | 1 | 85 | 270X | |
| | | HIRA | 0601.2 | 0601.4 | III | B | 2 | 40 | 230 | |
| | | IZMI | 0601.2 | 0601.5 | III | G | 2 | 45X | 270 | |
| | | POTS | 0601.2 | 0646.8 | III | G | 3 | 110U | 450 | |
| | | IZMI | 0601.3 | 0601.6 | V | | 2 | 45 | 65 | |
| | | IZMI | 0613.4 | 0745.0U | III | N | 1 | 45X | 135 | |
| | | POTS | 0620 | 1605 | III | N | 1 | 110U | 170U | |
| | | CULG | 0633.0 | 0636.0 | III | G | 1 | 25 | 90 | |
| | | SVTO | 0633.0 | 0739.0 | III | N | 2 | 35 | 85 | |
| | | IZMI | 0633.3 | 0634.6 | III | G | 2 | 45X | 135 | |
| | | ONDR | 0633.4 | 0637.4 | DCIM | G | 2 | 800 | 1990 | |
| | | POTS | 0637.1 | 0637.6 | DCIM | | 1 | 580 | 800X | |
| | | POTS | 0637.8 | 0646.8 | III | GG | 2 | 110U | 170U | |
| | | CULG | 0656.0 | 0702.0 | III | G | 1 | 25 | 160 | |
| | | POTS | 0656.1 | 0705.6 | III | GG,C | 3 | 110U | 400 | |
| | | IZMI | 0656.2 | 0657.1 | III | G | 2 | 45X | 135 | |
| | | IZMI | 0700.2 | 0701.6 | III | GG | 2 | 45X | 270X | |
| | | POTS | 0721.9 | 0722.3 | III | G | 2 | 110U | 170U | |
| | | CULG | 0731.0 | 0732.0 | III | G | 2 | 30 | 180 | |
| | | ONDR | 0731.1 | 0731.5 | DCIM | G | 2 | 800X | 1120 | |
| | | IZMI | 0731.2 | 0732.7 | III | GG | 2 | 45X | 270X | |
| | | POTS | 0731.2 | 0739.3 | III | GG | 3 | 110U | 400 | |
| | | POTS | 0731.5 | 0731.9 | DCIM | | 2 | 550 | 800X | |
| | | HIRA | 0731.6 | 0732.2 | III | G | 2 | 40 | 210 | |
| | | IZMI | 0735.7 | 0737.6 | III | GG | 2 | 45X | 270X | |
| | | CULG | 0736.0 | 0736.0 | III | G | 2 | 30 | 150 | |
| | | HIRA | 0736.0 | 0736.2 | III | B | 1 | 40 | 230 | |
| | | IZMI | 0738.3 | 0739.3 | III | G | 2 | 45X | 260 | |
| | | CULG | 0739.0 | 0739.0 | III | B | 1 | 30 | 90 | |
| | | IZMI | 0827.3 | 0827.5 | III | B | 2 | 60 | 215 | |
| | | POTS | 0827.3 | 0827.8 | III | G | 2 | 110U | 250 | |
| | | POTS | 0851.6 | 0852.2 | III | G | 2 | 110U | 375 | |
| | | IZMI | 0930.7 | 0931.2 | III | G | 2 | 80 | 270X | |
| | | POTS | 0930.8 | 0931.2 | III | G,C | 3 | 110U | 375 | |
| | | POTS | 0936.1 | 0944.8 | III | GG | 3 | 110U | 450 | |
| | | SVTO | 0942.0 | 0944.0 | III | | 2 | 35 | 66 | |
| | | IZMI | 0942.5 | 0945.3 | III | GG | 2 | 45X | 270X | |
| | | IZMI | 0946.4 | 0946.5 | III | B | 2 | 200 | 245 | |
| | | SVTO | 1015.0 | 1015.0 | III | | 2 | 35 | 66 | |
| | | IZMI | 1015.2 | 1015.4 | III | B | 2 | 45X | 265 | |
| | | POTS | 1015.2 | 1015.4 | III | G | 2 | 110U | 275 | |
| | | POTS | 1056.1 | 1056.5 | DCIM | | 1 | 250 | 450 | |
| | | ONDR | 1059.3 | 1101.3 | DCIM | GG | 3 | 800X | 1050 | |
| | | IZMI | 1059.6 | 1101.7 | III | GG | 2 | 45X | 260 | |
| | | SVTO | 1100.0 | 1107.0 | V | | 2 | 35 | 76 | |
| | | POTS | 1100.8 | 1101.6 | DCIM | P | 2 | 500 | 800X | |
| | | POTS | 1100.8 | 1108.5 | III | GG | 3 | 110U | 450 | |
| | | IZMI | 1106.0 | 1107.3 | III | GG | 2 | 45X | 270X | |
| | | IZMI | 1106.8 | 1107.1 | V | G | 2 | 115 | 150 | |
| | | POTS | 1139.0 | 1139.1 | III | B | 2 | 110U | 170U | |
| | | IZMI | 1144.7 | 1146.6 | III | GG | 2 | 45X | 270X | |
| | | POTS | 1144.7 | 1150.9 | III | GG,U,RS | 2 | 110U | 400 | |
| | | SGMR | 1146.0 | 1146.0 | III | | 1 | 30 | 60 | |
| | | SVTO | 1146.0 | 1146.0 | III | | 2 | 35 | 71 | |
| | | IZMI | 1150.4 | 1150.8 | III | G | 1 | 45X | 180 | |
| | | POTS | 1213.9 | 1215.6 | III | G | 2 | 110U | 170U | |
| | | POTS | 1256.0 | 1256.3 | III | B | 2 | 110U | 200U | |
| | | POTS | 1327.9 | 1337.2 | III | GG | 2 | 110U | 300 | |
| | | POTS | 1328.0 | 1328.7 | DCIM | | 2 | 350 | 600 | |
| 0532 | 1634 | ONDR | 1328.0 | 1328.2 | DCIM | | 1 | 2020 | 4400X | |
| | | SGMR | 1331.0 | 1331.0 | III | | 1 | 30 | 80 | |
| | | SVTO | 1331.0 | 1331.0 | III | | 2 | 35 | 83 | |
| | | SGMR | 1415.0 | 1442.0 | III | N | 1 | 30 | 80 | |
| | | POTS | 1415.4 | 1422.3 | III | GG | 2 | 110U | 475 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| OBSERVATION Start (UT) | End (UT) | Day | Sta | EVENT Start (UT) | End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 08 | SVTO | 1418.0 | 1422.0 | III | | 2 | 35 | 68 | |
| | | | SVTO | 1441.0 | 1442.0 | III | | 2 | 35 | 85 | |
| | | | POTS | 1441.8 | 1442.1 | III | G | 3 | 110U | 250 | |
| | | | POTS | 1454.8 | 1459.7 | III | GG | 2 | 110U | 250 | |
| 2008 | 2400 | | HIRA | | | | | | | | |
| 2035 | 2400 | | CULG | | | | | | | | |
| | | 09 | | | | | | | | | |
| 0000 | 0911 | | HIRA | | | | | | | | |
| 0000 | 0750 | | CULG | 0134.0 | 0134.0 | III | B | 1 | 60 | 270 | |
| | | | POTS | 0529 | 1510 | III | N | 1 | 110U | 170U | |
| 0530 | 1635 | | ONDR | | | | | | | | |
| | | | POTS | 0536.3 | 0536.4 | III | B | 2 | 110U | 170U | |
| | | | POTS | 0550.6 | 0550.9 | III | G | 2 | 110U | 170U | |
| 0627 | 1200 | | IZMI | 0627.0E | 1020.0U | I | N | 1 | 100 | 260 | |
| 0518 | 1641 | | POTS | 0815 E | 1641 U | I | S | 1 | 110U | 350 | 40-90 MHz no obs |
| | | | IZMI | 1053.0 | 1053.1 | III | B | 1 | 45 | 90 | |
| | | | POTS | 1139.8 | 1140.1 | III | G,U | 2 | 110U | 400 | |
| | | | POTS | 1204.4 | 1206.1 | III | G | 2 | 110U | 275 | |
| | | | POTS | 1305.7 | 1306.4 | DCIM | | 2 | 200U | 400 | |
| | | | POTS | 1306.2 | 1308.9 | III | G | 2 | 110U | 375 | |
| | | | POTS | 1328.5 | 1329.0 | III | G | 2 | 110U | 170U | |
| | | | SGMR | 1428.0 | 1434.0 | III | | 1 | 30 | 80 | |
| | | | SVTO | 1428.0 | 1434.0 | III | | 2 | 35 | 85 | |
| | | | SVTO | 1428.0 | 1435.0 | III | | 2 | 35 | 85 | |
| | | | POTS | 1433.7 | 1434.2 | III | G | 2 | 110U | 225 | |
| | | | POTS | 1531.7 | 1533.2 | DCIM | | 2 | 200U | 500 | |
| | | | POTS | 1531.8 | 1533.4 | III | G,U | 3 | 110U | 300U | |
| | | | SGMR | 1532.0 | 1533.0 | III | | 2 | 30 | 80 | |
| | | | SVTO | 1532.0 | 1533.0 | III | | 3 | 35 | 85 | |
| 2007 | 2400 | | HIRA | | | | | | | | |
| | | | PALE | 2229.0 | 2230.0 | III | | 1 | 25 | 65 | |
| 2035 | 2400 | | CULG | 2230.0 | 2230.0 | III | B | 1 | 25 | 90 | |
| | | 10 | | | | | | | | | |
| 0000 | 0912 | | HIRA | | | | | | | | |
| 0000 | 0745 | | CULG | 0447.0 | 0448.0 | III | G | 1 | 30 | 90 | |
| 0528 | 1636 | | ONDR | | | | | | | | |
| 0518 | 1641 | | POTS | 0532 | 1641 U | I | S,W | 1 | 110U | 300U | 40-90 MHz no obs |
| | | | POTS | 0623.1 | 0623.2 | III | B | 2 | 110U | 170U | |
| | | | POTS | 0836.3 | 0836.4 | III | B | 1 | 110U | 155 | |
| | | | POTS | 0855.9 | 0856.0 | III | B | 1 | 110U | 150 | |
| 0700 | 1015 | | IZMI | 0900.0U | 1015.0D | I | S | 1 | 200 | 250 | |
| | | | SVTO | 0947.0 | 0948.0 | III | | 2 | 35 | 69 | |
| | | | IZMI | 0947.7 | 0947.9 | III | G | 2 | 45X | 165 | |
| | | | POTS | 0947.7 | 0947.8 | III | B | 2 | 110U | 170U | |
| 1100 | 1200 | | IZMI | 1100.0E | 1200.0U | I | N | 1 | 200 | 250 | |
| | | | POTS | 1302.0 | 1302.8 | DCIM | | 2 | 200U | 400 | |
| | | | SVTO | 1302.0 | 1302.0 | III | | 2 | 38 | 53 | |
| | | | POTS | 1302.2 | 1302.4 | III | B | 2 | 110U | 300 | |
| | | | POTS | 1354.2 | 1355.2 | III | G | 2 | 110U | 170U | |
| | | | POTS | 1416.2 | 1416.7 | III | G | 2 | 110U | 260 | |
| | | | POTS | 1427.1 | 1427.9 | III | G | 2 | 110U | 250 | |
| | | | POTS | 1429.3 | 1429.5 | III | G | 2 | 110U | 170U | |
| | | | POTS | 1440.6 | 1440.8 | III | G | 1 | 200U | 350 | |
| 2005 | 2400 | | HIRA | | | | | | | | |
| 2035 | 2400 | | CULG | 2044.0 | 2045.0 | III | G | 1 | 55 | 170 | |
| | | | CULG | 2052.0 | 2052.0 | III | B | 1 | 55 | 170 | |
| | | 11 | | | | | | | | | |
| 0000 | 0913 | | HIRA | | | | | | | | |
| 0526 | 1637 | | ONDR | | | | | | | | |
| 0548 | 1200 | | IZMI | 0603.8 | 0604.1 | III | G | 2 | 200 | 270X | |
| | | | SVTO | 0722.0 | 0722.0 | III | | 2 | 36 | 84 | |
| 0000 | 0745 | | CULG | 0722.0 | 0722.0 | III | B | 1 | 35 | 110 | |
| | | | IZMI | 0722.3 | 0722.4 | III | G | 2 | 45X | 145 | |
| | | | IZMI | 0722.4 | 0722.6 | V | | 2 | 45 | 75 | |
| | | | IZMI | 0907.0 | 0907.1 | III | B | 1 | 200 | 270X | |
| | | | IZMI | 0928.6 | 0928.7 | III | G | 1 | 60 | 95 | |
| | | | SVTO | 0932.0 | 0934.0 | III | | 2 | 35 | 65 | |
| | | | IZMI | 0932.4 | 0933.9 | III | GG | 2 | 45X | 170 | |
| | | | SGMR | 1138.0 | 1251.0 | III | N | 2 | 30 | 80 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| Day | OBSERVATION Start (UT) | OBSERVATION End (UT) | Sta | EVENT Start (UT) | EVENT End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | FREQUENCY Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | | | SVTO | 1138.0 | 1252.0 | III | N | 2 | 35 | 82 | |
| | | | IZMI | 1138.1 | 1138.3 | III | B | 1 | 45X | 95 | |
| | 1341 | 1439 | POTS | 1341 E | 1439 U | I | S,W | 1 | 150 | 170U | |
| | | | SGMR | 1346.0 | 1351.0 | III | | 1 | 30 | 67 | |
| | | | SVTO | 1346.0 | 1347.0 | III | | 2 | 36 | 60 | |
| | | | POTS | 1406.5 | 1406.6 | III | B | 1 | 40X | 70 | |
| | | | POTS | 1416.1 | 1416.4 | III | B | 2 | 40X | 170U | |
| | | | SGMR | 1640.0 | 1642.0 | III | | 1 | 30 | 55 | |
| | | | PALE | 1916.0 | 1916.0 | III | | 1 | 25 | 55 | |
| | 2004 | 2400 | HIRA | | | | | | | | |
| | | | PALE | 2031.0 | 2031.0 | III | | 1 | 25 | 55 | |
| | 2035 | 2400 | CULG | | | | | | | | |
| 12 | 0000 | 0914 | HIRA | | | | | | | | |
| | 0000 | 0745 | CULG | 0046.0 | 0046.0 | III | B | 1 | 20 | 75 | |
| | | | CULG | 0050.0 | 0050.0 | III | B | 1 | 25 | 55 | |
| | | | CULG | 0142.0 | 0143.0 | III | G | 1 | 40 | 150 | |
| | | | CULG | 0350.0 | 0350.0 | III | B | 1 | 35 | 160 | |
| | 0524 | 1638 | ONDR | | | | | | | | |
| | 0606 | 1200 | IZMI | 0814.1 | 0814.2 | III | B | 1 | 45 | 125 | |
| | 2003 | 2400 | HIRA | | | | | | | | |
| | | | PALE | 2247.0 | 2258.0 | III | N | 1 | 25 | 55 | |
| | 2035 | 2400 | CULG | 2248.0 | 2248.0 | III | B | 1 | 40 | 180 | |
| | | | CULG | 2258.0 | 2258.0 | III | B | 1 | 20 | 80 | |
| 13 | 0000 | 0740 | CULG | | | | | | | | |
| | 0000 | 0915 | HIRA | | | | | | | | |
| | 0522 | 1640 | ONDR | | | | | | | | |
| | | | SGMR | 1416.0 | 1416.0 | III | | 1 | 30 | 60 | |
| | | | SVTO | 1416.0 | 1416.0 | III | | 1 | 40 | 62 | |
| | 2002 | 2400 | HIRA | | | | | | | | |
| | 2035 | 2400 | CULG | | | | | | | | |
| 14 | 0000 | 0916 | HIRA | | | | | | | | |
| | 0520 | 1643 | ONDR | | | | | | | | |
| | 0000 | 0740 | CULG | 0533.0 | 0536.0 | III | G | 1 | 25 | 80 | |
| | 0455 | 1702 | POTS | 0533.5 | 0535.9 | III | G | 2 | 40X | 70 | |
| | | | POTS | 0638 | 1702 U | I | S,W | 1 | 130 | 300 | |
| | | | POTS | 0803.7 | 0810.9 | III | G | 3 | 40X | 250 | |
| | | | POTS | 1046.1 | 1048.0 | III | G | 2 | 40X | 150 | |
| | | | POTS | 1316.2 | 1316.4 | III | G | 2 | 40X | 170 | |
| | | | POTS | 1418 | 1535 | III | N | 1 | 110U | 170U | |
| | | | POTS | 1454.5 | 1454.8 | III | G | 2 | 40X | 250 | |
| | | | POTS | 1556.9 | 1609.1 | III | G | 2 | 40X | 250 | |
| | 2000 | 2400 | HIRA | | | | | | | | |
| | 2035 | 2400 | CULG | | | | | | | | |
| 15 | 0000 | 0917 | HIRA | | | | | | | | |
| | 0000 | 0740 | CULG | 0151.0 | 0152.0 | III | G | 1 | 20 | 170 | |
| | 0518 | 1642 | ONDR | | | | | | | | |
| | 1302 | 1702 | POTS | 1302 E | 1702 U | I | S | 2 | 110U | 250 | |
| | | | POTS | 1634.5 | 1634.9 | III | B | 2 | 40X | 70 | |
| | 1958 | 2400 | HIRA | | | | | | | | |
| | | | PALE | 2059.0 | 2059.0 | III | | 1 | 25 | 75 | |
| | 2035 | 2400 | CULG | 2059.0 | 2059.0 | III | B | 1 | 30 | 90 | |
| | | | PALE | 2319.0 | 2320.0 | III | | 1 | 25 | 55 | |
| | | | CULG | 2320.0 | 2321.0 | III | G | 1 | 20 | 80 | |
| 16 | 0000 | 0735 | CULG | 0132.0 | 0132.0 | III | B | 1 | 30 | 90 | |
| | | | CULG | 0211.0 | 0230.0 | III | N | 1 | 30 | 180 | |
| | | | PALE | 0215.0 | 0215.0 | III | | 1 | 25 | 75 | |
| | | | CULG | 0303.0 | 0310.0 | III | G | 1 | 20 | 160 | |
| | | | PALE | 0303.0 | 0307.0 | III | | 1 | 25 | 55 | |
| | 0000 | 0918 | HIRA | 0305.0 | 0308.0 | III | G | 1 | 60 | 170 | |
| | | | HIRA | 0402.8 | 0403.0 | III | B | 1 | 50 | 180 | |
| | | | CULG | 0403.0 | 0408.0 | III | G | 1 | 30 | 180 | |
| | | | HIRA | 0442.8 | 0443.0 | III | B | 1 | 90 | 230 | |
| | | | CULG | 0443.0 | 0443.0 | III | B | 1 | 55 | 270 | |
| | | | CULG | 0445.0 | 0454.0 | III | G | 1 | 30 | 90 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| OBSERVATION Day | Start (UT) | End (UT) | Sta | EVENT Start (UT) | End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 0516 | 1644 | ONDR | | | | | | | | |
| | 0527 | 1451 | POTS | 0527 E | 1451 U | I | S | 1 | 110U | 300 | |
| | | | POTS | 0538.6 | 0538.9 | III | G | 2 | 40X | 170U | |
| | | | POTS | 0624.7 | 0624.8 | III | G | 1 | 110U | 145 | |
| | | | POTS | 0654.7 | 0655.0 | III | G | 3 | 40X | 225 | |
| | | | CULG | 0655.0 | 0655.0 | III | B | 1 | 50 | 140 | |
| | | | SVTO | 0741.0 | 0757.0 | III | N | 2 | 35 | 66 | |
| | | | POTS | 0741.2 | 0741.5 | III | G | 2 | 40X | 145 | |
| | | | POTS | 0756.0 | 0756.4 | III | G | 2 | 40X | 225 | |
| | | | POTS | 0757.1 | 0757.3 | III | G | 2 | 40X | 170U | |
| | | | POTS | 0803.7 | 0805.3 | III | G | 2 | 40X | 225 | |
| | | | POTS | 0915.5 | 0915.8 | III | G | 2 | 40X | 110U | |
| | | | SVTO | 0959.0 | 1003.0 | III | | 2 | 35 | 80 | |
| | | | POTS | 0959.2 | 1003.5 | III | G | 3 | 40X | 250 | |
| | | | POTS | 1007.7 | 1007.9 | III | G | 1 | 110U | 170U | |
| | | | POTS | 1137.7 | 1137.9 | III | G | 1 | 40X | 170U | |
| | 1957 | 2400 | HIRA | | | | | | | | |
| | 2030 | 2400 | CULG | 2055.0 | 2055.0 | III | B | 1 | 25 | 90 | |
| | | | CULG | 2138.0 | 2138.0 | III | B | 1 | 30 | 80 | |
| 17 | 0000 | 0918 | HIRA | | | | | | | | |
| | 0000 | 0735 | CULG | 0102.0 | 0102.0 | III | B | 1 | 180 | 470 | |
| | | | CULG | 0107.0 | 0115.0 | III | G | 1 | 30 | 180 | |
| | 0514 | 1645 | ONDR | | | | | | | | |
| | | | SVTO | 0720.0 | 0723.0 | V | | 3 | 35 | 85 | |
| | | | CULG | 0721.0 | 0723.0 | III | G | 1 | 30 | 180 | |
| | | | SGMR | 1712.0 | 1713.0 | III | | 1 | 30 | 60 | |
| | | | PALE | 1818.0 | 1824.0 | III | | 1 | 25 | 55 | |
| | | | SGMR | 1818.0 | 1824.0 | III | | 1 | 30 | 65 | |
| | 1956 | 2400 | HIRA | | | | | | | | |
| | 2030 | 2400 | CULG | | | | | | | | |
| 18 | 0000 | 0730 | CULG | | | | | | | | |
| | 0000 | 0919 | HIRA | | | | | | | | |
| | 0512 | 1647 | ONDR | | | | | | | | |
| | 1954 | 2400 | HIRA | | | | | | | | |
| | | | PALE | 2019.0 | 2020.0 | III | | 1 | 30 | 60 | |
| | 2030 | 2400 | CULG | | | | | | | | |
| 19 | 0000 | 0730 | CULG | | | | | | | | |
| | 0000 | 0920 | HIRA | | | | | | | | |
| | 0511 | 1650 | ONDR | | | | | | | | |
| | 0741 | 1016 | POTS | 0741 E | 1016 U | I | S | 2 | 80 | 170U | |
| | | | SVTO | 0813.0 | 0814.0 | III | | 1 | 35 | 45 | |
| | | | SGMR | 1437.0 | 1438.0 | III | | 1 | 30 | 80 | |
| | | | SVTO | 1437.0 | 1437.0 | III | | 2 | 36 | 72 | |
| | | | SGMR | 1559.0 | 1600.0 | III | | 1 | 30 | 60 | |
| | | | SVTO | 1559.0 | 1600.0 | III | | 2 | 36 | 85 | |
| | | | PALE | 1831.0 | 1831.0 | III | | 1 | 45 | 60 | |
| | | | PALE | 1853.0 | 1853.0 | III | | 1 | 40 | 55 | |
| | | | PALE | 2140.0 | 2140.0 | III | | 2 | 25 | 75 | |
| | | | SGMR | 2140.0 | 2140.0 | III | | 2 | 30 | 80 | |
| | 2030 | 2400 | CULG | 2140.0 | 2140.0 | III | B | 2 | 23 | 180 | |
| | 1953 | 2400 | HIRA | 2140.5 | 2140.6 | III | B | 1 | 50 | 130 | |
| | | | PALE | 2200.0 | 2203.0 | III | | 2 | 25 | 75 | |
| | | | SGMR | 2202.0 | 2202.0 | III | | 1 | 30 | 60 | |
| | | | CULG | 2203.0 | 2204.0 | III | G | 1 | 23 | 180 | |
| | | | CULG | 2240.0 | 2240.0 | III | B | 1 | 30 | 90 | |
| | | | PALE | 2240.0 | 2240.0 | III | | 1 | 25 | 55 | |
| | | | CULG | 2302.0 | 2302.0 | III | B | 1 | 30 | 130 | |
| | | | PALE | 2302.0 | 2302.0 | III | | 1 | 28 | 56 | |
| 20 | 0000 | 0730 | CULG | 0032.0 | 0100.0 | III | N | 1 | 30 | 130 | |
| | | | PALE | 0049.0 | 0049.0 | III | | 1 | 42 | 52 | |
| | | | PALE | 0143.0 | 0145.0 | III | | 2 | 25 | 75 | |
| | | | CULG | 0144.0 | 0146.0 | III | G | 2 | 18X | 160 | |
| | 0000 | 0921 | HIRA | 0145.4 | 0145.8 | III | B | 1 | 25X | 120 | |
| | | | CULG | 0307.0 | 0310.0 | III | G | 1 | 35 | 180 | |
| | | | HIRA | 0307.0 | 0307.2 | III | B | 1 | 50 | 230 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| Day | OBSERVATION Start (UT) | OBSERVATION End (UT) | Sta | EVENT Start (UT) | EVENT End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | FREQUENCY Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | | | PALE | 0310.0 | 0310.0 | III | | 1 | 44 | 57 | |
| | | | CULG | 0442.0 | 0442.0 | III | B | 2 | 23 | 110 | |
| | | | SVTO | 0452.0 | 0455.0 | III | | 2 | 36 | 73 | |
| | | | CULG | 0453.0 | 0456.0 | III | G | 2 | 20 | 180 | |
| | 0509 | 1651 | ONDR | | | | | | | | |
| | | | SVTO | 0529.0 | 0531.0 | III | | 2 | 35 | 85 | |
| | | | CULG | 0530.0 | 0531.0 | III | G | 2 | 20 | 90 | |
| | | | CULG | 0622.0 | 0622.0 | III | B | 1 | 30 | 65 | |
| | | | CULG | 0635.0 | 0635.0 | III | B | 2 | 20 | 110 | |
| | | | SVTO | 0635.0 | 0647.0 | III | N | 3 | 35 | 85 | |
| | | | CULG | 0642.0 | 0643.0 | III | G | 1 | 20 | 180 | |
| | | | CULG | 0646.0 | 0648.0 | III | G | 1 | 20 | 180 | |
| | | | SVTO | 0731.0 | 0748.0 | III | N | 3 | 35 | 85 | |
| | | | HIRA | 0737.5 | 0737.8 | III | B | 1 | 40 | 220 | |
| | | | HIRA | 0747.6 | 0747.8 | III | B | 1 | 40 | 230 | |
| | 0757 | 0817 | POTS | 0757 E | 0817 U | I | S | 1 | 110U | 250 | |
| | | | POTS | 0806.2 | 0806.3 | III | B | 1 | 40X | 70 | |
| | 0825 | 1522 | POTS | 0825 E | 1522 U | III | B | 2 | 110U | 400 | |
| | | | POTS | 0834.5 | 0834.7 | III | B | 2 | 40X | 250 | |
| | | | POTS | 0844.2 | 0845.4 | III | B | 1 | 110U | 170U | |
| | | | POTS | 0957.7 | 0957.8 | III | B | 1 | 110U | 225 | |
| | | | POTS | 1056.7 | 1057.3 | III | G | 1 | 40X | 120 | |
| | | | POTS | 1101.1 | 1109.1 | III | G | 2 | 110U | 170U | |
| | | | SVTO | 1111.0 | 1116.0 | V | | 2 | 35 | 79 | |
| | | | POTS | 1112.0 | 1116.5 | III | GG | 2 | 40X | 90U | |
| | | | SGMR | 1115.0 | 1116.0 | III | | 1 | 30 | 80 | |
| | | | POTS | 1119 | 1456 | III | N | 1 | 40X | 90U | |
| | | | POTS | 1258.1 | 1259.2 | III | G | 2 | 40X | 170U | |
| | | | POTS | 1312.2 | 1312.4 | III | B | 2 | 40X | 120 | |
| | | | POTS | 1412.1 | 1412.7 | III | G | 1 | 110U | 160 | |
| | | | SGMR | 1428.0 | 1428.0 | III | | 2 | 30 | 80 | |
| | | | SVTO | 1428.0 | 1447.0 | III | N | 3 | 36 | 84 | |
| | | | POTS | 1428.1 | 1428.6 | III | G | 3 | 40X | 170U | |
| | | | POTS | 1433.6 | 1433.7 | III | B | 1 | 110U | 160 | |
| | | | POTS | 1445.8 | 1448.1 | III | G | 2 | 40X | 170U | |
| | | | SGMR | 1446.0 | 1446.0 | III | | 1 | 30 | 75 | |
| | | | SGMR | 1501.0 | 1700.0 | CONT | | 1 | 30 | 50 | |
| | | | SGMR | 1501.0 | 1700.0 | III | | 1 | 30 | 50 | |
| | | | SGMR | 1833.0 | 1834.0 | III | | 2 | 30 | 70 | |
| | 1952 | 2400 | HIRA | | | | | | | | |
| | 2030 | 2400 | CULG | 2041.0 | 2041.0 | III | B | 1 | 30 | 120 | |
| 21 | 0000 | 0922 | HIRA | | | | | | | | |
| | 0000 | 0725 | CULG | 0010.0 | 0725.0D | III | S | 1 | 20 | 80 | |
| | | | PALE | 0026.0 | 0026.0 | III | | 1 | 25 | 55 | |
| | | | CULG | 0357.0 | 0725.0D | I | S | 1 | 110 | 170 | |
| | 0434 | 1718 | POTS | 0434 E | 1718 U | I | S,C,DC | 2 | 40X | 400 | |
| | | | POTS | 0455 | 1714 | III | N | 1 | 40X | 90U | |
| | 0507 | 1652 | ONDR | | | | | | | | |
| | | | SVTO | 0508.0 | 1712.0 | CONT | | 2 | 35 | 85 | |
| | | | POTS | 0541.1 | 0541.3 | III | G | 2 | 110U | 325 | |
| | | | SVTO | 0544.0 | 0545.0 | III | | 1 | 37 | 79 | |
| | | | SGMR | 1149.0 | 2131.0 | CONT | | 2 | 30 | 55 | |
| | | | PALE | 1751.0 | 0356.0 | CONT | | 1 | 25 | 56 | |
| | 1950 | 2400 | HIRA | | | | | | | | |
| | 2035 | 2400 | CULG | 2035.0E | 2400.0D | III | S | 1 | 20 | 180 | |
| 22 | 0000 | 0923 | HIRA | | | | | | | | |
| | 0000 | 0720 | CULG | 0000.0E | 0720.0D | III | S | 1 | 20 | 180 | |
| | 0434 | 1718 | POTS | 0434 E | 1718 U | I | S,C,DC | 2 | 110U | 300 | |
| | | | POTS | 0448 | 1711 | III | N | 1 | 40X | 90U | |
| | 0505 | 1653 | ONDR | | | | | | | | |
| | | | SVTO | 0548.0 | 1628.0 | CONT | | 1 | 35 | 85 | |
| | | | POTS | 0647 | 1640 | III | N | 2 | 40X | 90U | |
| | | | POTS | 0728.7 | 0728.8 | III | B | 2 | 120 | 170U | |
| | | | POTS | 0815.0 | 0815.4 | III | B | 2 | 40X | 170U | |
| | | | SVTO | 0815.0 | 0815.0 | III | | 2 | 35 | 67 | |
| | | | POTS | 0837.4 | 0837.7 | III | B | 2 | 40X | 145 | |
| | | | POTS | 0916.2 | 0916.4 | III | B | 2 | 40X | 170U | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| OBSERVATION Start (UT) | End (UT) | Sta | EVENT Start (UT) | End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 22 | | POTS | 0940.4 | 0940.9 | III | G | 2 | 40X | 250 | |
| | | SGMR | 1107.0 | 2120.0 | CONT | | 2 | 30 | 80 | |
| | | POTS | 1412.2 | 1412.4 | III | B | 2 | 40X | 225 | |
| | | POTS | 1418.8 | 1419.1 | III | G | 2 | 50 | 140 | |
| 1949 | 2400 | HIRA | | | | | | | | |
| 2040 | 2400 | CULG | 2040.0E | 2400.0D | III | S | 1 | 20 | 100 | |
| 23 0000 | 0924 | HIRA | | | | | | | | |
| 0000 | 0725 | CULG | 0000.0E | 0725.0D | III | S | 1 | 20 | 100 | |
| | | CULG | 0132.0 | 0725.0D | I | S | 1 | 110 | 160 | |
| 0434 | 1721 | POTS | 0434 E | 1721 U | I | S,C,DC | 2 | 40X | 225 | |
| | | POTS | 0440 | 1719 | III | N | 1 | 40X | 90U | |
| | | SVTO | 0445.0 | 1714.0 | CONT | | 1 | 35 | 85 | |
| | | POTS | 0446 | 1710 | III | N | 2 | 40X | 90U | |
| 0503 | 1656 | ONDR | | | | | | | | |
| | | POTS | 0548.4 | 0550.1 | III | G | 3 | 40X | 225 | |
| | | POTS | 0734.9 | 0735.3 | DCIM | | 1 | 325 | 400 | |
| | | SGMR | 1110.0 | 2029.0 | CONT | | 1 | 30 | 80 | |
| | | PALE | 1741.0 | 1741.0 | III | | 1 | 39 | 52 | |
| | | PALE | 1800.0 | 1800.0 | III | | 1 | 42 | 56 | |
| | | PALE | 1809.0 | 0335.0 | CONT | | 1 | 36 | 56 | |
| 1948 | 2400 | HIRA | | | | | | | | |
| 2035 | 2400 | CULG | 2035.0E | 2400.0D | III | S | 1 | 25 | 150 | |
| | | PALE | 2150.0 | 2151.0 | III | | 2 | 30 | 60 | |
| | | SGMR | 2150.0 | 2150.0 | III | | 1 | 30 | 55 | |
| | | CULG | 2159.0 | 2200.0 | III | G | 1 | 100 | 290 | |
| 24 0000 | 0925 | HIRA | | | | | | | | |
| 0000 | 0725 | CULG | 0000.0E | 0725.0D | III | S | 1 | 25 | 150 | |
| 0434 | 1718 | POTS | 0434 E | 1718 U | I | S,C,DC | 2 | 40X | 225 | |
| | | POTS | 0443 | 1657 | III | N | 1 | 40X | 90U | |
| | | SVTO | 0454.0 | 1550.0 | CONT | | 2 | 35 | 85 | |
| | | POTS | 0455.0 | 0455.4 | III | G | 2 | 40X | 170U | |
| | | POTS | 0456.9 | 0457.0 | III | B | 2 | 110U | 170U | |
| 0502 | 1655 | ONDR | | | | | | | | |
| | | POTS | 0528 | 1701 | III | N | 2 | 40X | 90U | |
| | | POTS | 0559.6 | 0559.7 | III | B | 2 | 110U | 360 | |
| | | SGMR | 1151.0 | 2313:0 | CONT | | 1 | 30 | 65 | |
| | | POTS | 1324.4 | 1324.5 | III | B | 2 | 110U | 325 | |
| 1947 | 2400 | HIRA | | | | | | | | |
| 2035 | 2400 | CULG | 2143.0 | 2350.0 | III | S | 1 | 25 | 160 | |
| 25 0000 | 0725 | CULG | | | | | | | | |
| 0000 | 0926 | HIRA | | | | | | | | |
| 0434 | 1718 | POTS | 0447 | 1718 U | I | S,C | 1 | 110U | 350 | |
| 0500 | 1657 | ONDR | | | | | | | | |
| | | POTS | 0605.8 | 0605.9 | III | B | 2 | 110U | 150 | |
| | | POTS | 0939.6 | 0939.7 | III | B | 1 | 40X | 90U | |
| | | POTS | 0941.6 | 0941.7 | III | B | 1 | 110U | 150 | |
| 1946 | 2400 | HIRA | | | | | | | | |
| 2040 | 2400 | CULG | | | | | | | | |
| 26 0000 | 0720 | CULG | | | | | | | | |
| 0000 | 0926 | HIRA | | | | | | | | |
| 0434 | 1720 | POTS | 0434 E | 1720 U | I | S | 1 | 130U | 375 | |
| 0458 | 1657 | ONDR | | | | | | | | |
| | | POTS | 0825.4 | 0825.8 | III | G | 1 | 40X | 170U | |
| | | POTS | 1106.9 | 1110.7 | III | G | 2 | 40X | 170U | |
| | | POTS | 1124.1 | 1124.4 | III | G | 2 | 110U | 155 | |
| | | POTS | 1155.0 | 1155.1 | III | G | 1 | 110U | 140 | |
| | | POTS | 1206.1 | 1206.2 | III | B | 2 | 110U | 155 | |
| | | POTS | 1229.2 | 1229.5 | III | G | 1 | 40X | 135 | |
| | | POTS | 1254.4 | 1301.9 | III | GG | 2 | 40X | 400 | |
| | | SGMR | 1541.0 | 1542.0 | III | | 1 | 30 | 60 | |
| | | SVTO | 1541.0 | 1542.0 | III | | 2 | 35 | 85 | |
| | | POTS | 1541.8 | 1542.1 | III | B | 2 | 40X | 250 | |
| | | POTS | 1651.2 | 1651.3 | III | B | 1 | 130 | 170U | |
| 1944 | 2400 | HIRA | | | | | | | | |
| 2040 | 2140 | CULG | | | | | | | | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| Day | OBSERVATION Start (UT) | OBSERVATION End (UT) | Sta | EVENT Start (UT) | EVENT End (UT) | EVENT Spectral Class | EVENT Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | FREQUENCY Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 2248 | 2400 | CULG | | | | | | | | |
| 27 | 0000 | 0720 | CULG | | | | | | | | |
| | 0000 | 0927 | HIRA | | | | | | | | |
| | 0434 | 1720 | POTS | 0434 E | 1720 U | I | S,W | 1 | 140 | 350 | |
| | 0456 | 1659 | ONDR | | | | | | | | |
| | | | POTS | 0545.9 | 0546.0 | III | G | 2 | 110U | 170U | |
| | | | POTS | 0653.6 | 0654.4 | III | G | 1 | 110U | 250 | |
| | | | POTS | 0705.2 | 0705.4 | III | B | 1 | 40X | 170U | |
| | | | POTS | 0740.4 | 0740.6 | III | B | 2 | 40X | 140 | |
| | | | POTS | 0945.2 | 0945.4 | III | B | 1 | 140 | 170U | |
| | | | POTS | 1059.6 | 1059.7 | III | B | 1 | 110U | 170U | |
| | | | POTS | 1248.7 | 1249.1 | III | G,U | 2 | 110U | 225 | |
| | | | POTS | 1355.4 | 1355.6 | III | B | 2 | 40X | 170U | |
| | | | POTS | 1430.1 | 1435.1 | III | GG | 2 | 40X | 600 | |
| | | | POTS | 1500.0 | 1500.5 | III | G | 2 | 50 | 170U | |
| | 1943 | 2400 | HIRA | | | | | | | | |
| | 2045 | 2400 | CULG | | | | | | | | |
| 28 | 0000 | 0720 | CULG | | | | | | | | |
| | 0000 | 0928 | HIRA | | | | | | | | |
| | 0434 | 1720 | POTS | 0442 | 1558 | I | S | 1 | 140 | 350 | |
| | | | POTS | 0443.6 | 0443.7 | III | B | 2 | 110U | 150 | |
| | 0455 | 1702 | ONDR | | | | | | | | |
| | 2045 | 2400 | CULG | 2234.0 | 2234.0 | III | B | 1 | 40 | 220 | |
| | 1942 | 2400 | HIRA | 2234.6 | 2234.7 | III | B | 1 | 40 | 220 | |
| 29 | 0000 | 0720 | CULG | | | | | | | | |
| | 0000 | 0929 | HIRA | | | | | | | | |
| | 0434 | 1720 | POTS | 0434 E | 1720 U | I | S,W | 1 | 140 | 300 | |
| | 0453 | 1703 | ONDR | | | | | | | | |
| | | | POTS | 0639.8 | 0640.2 | III | G | 2 | 110U | 225 | |
| | | | SVTO | 0841.0 | 0843.0 | III | | 2 | 35U | 65U | |
| | | | POTS | 0841.2 | 0841.6 | DCIM | | 2 | 400 | 700 | |
| | | | POTS | 0841.2 | 0841.6 | III | G | 2 | 40X | 170U | |
| | | | POTS | 0842.1 | 0843.0 | III | G | 2 | 40X | 170U | |
| | | | POTS | 0943.0 | 0946.4 | III | G | 2 | 40X | 250 | |
| | | | SVTO | 0945.0 | 0945.0 | III | | 2 | 35 | 62 | |
| | | | POTS | 1009.3 | 1010.1 | III | G | 2 | 40X | 90U | |
| | | | POTS | 1026.1 | 1029.6 | III | G | 1 | 110U | 170U | |
| | | | POTS | 1059.9 | 1101.1 | III | G | 2 | 40X | 225 | |
| | | | POTS | 1120.3 | 1120.4 | DCIM | | 2 | 325 | 700 | |
| | | | SGMR | 1123.0 | 1123.0 | III | | 1 | 30 | 80 | |
| | | | SVTO | 1123.0 | 1123.0 | III | | 2 | 35 | 77 | |
| | | | POTS | 1123.2 | 1123.8 | III | G | 2 | 40X | 145 | |
| | | | POTS | 1123.5 | 1123.6 | DCIM | | 1 | 325 | 375 | |
| | | | POTS | 1346.9 | 1350.7 | III | G | 2 | 40X | 170U | |
| | | | POTS | 1359.3 | 1402.1 | III | G | 2 | 40X | 250 | |
| | | | SGMR | 1431.0 | 1431.0 | III | | 1 | 30 | 60 | |
| | | | SVTO | 1431.0 | 1431.0 | III | | 2 | 35 | 85 | |
| | | | POTS | 1431.1 | 1433.5 | III | G | 2 | 40X | 225 | |
| | | | POTS | 1448.0 | 1448.2 | III | B | 2 | 40X | 350 | |
| | | | PALE | 1858.0 | 1859.0 | III | | 1 | 25 | 60 | |
| | | | SGMR | 1858.0 | 1859.0 | III | | 1 | 30 | 60 | |
| | | | SGMR | 2027.0 | 2028.0 | III | | 1 | 30 | 60 | |
| | | | PALE | 2127.0 | 2128.0 | III | | 1 | 25 | 70 | |
| | | | SGMR | 2127.0 | 2128.0 | III | | 1 | 30 | 60 | |
| | 2045 | 2400 | CULG | 2128.0 | 2128.0 | III | B | 1 | 25 | 100 | |
| | | | CULG | 2216.0 | 2218.0 | III | G | 2 | 20 | 100 | |
| | | | PALE | 2216.0 | 2217.0 | III | | 2 | 25 | 70 | |
| | | | SGMR | 2216.0 | 2231.0 | III | N | 2 | 30 | 80 | |
| | 1941 | 2400 | HIRA | 2216.2 | 2216.4 | III | B | 2 | 25X | 120 | |
| | | | CULG | 2219.0 | 2219.0 | III | B | 1 | 30 | 70 | |
| | | | CULG | 2231.0 | 2232.0 | III | G | 2 | 18 | 300 | |
| | | | HIRA | 2231.0 | 2231.2 | III | B | 2 | 25X | 230 | |
| | | | PALE | 2231.0 | 2231.0 | III | | 1 | 25 | 75 | |
| 30 | 0000 | 0930 | HIRA | | | | | | | | |
| | 0000 | 0720 | CULG | 0044.0 | 0044.0 | III | B | 1 | 30 | 180 | |

# S O L A R  R A D I O  E M I S S I O N
## Spectral Observations

### APRIL 1999

| OBSERVATION Start (UT) | End (UT) | Sta | EVENT Start (UT) | End (UT) | Spectral Class | Event Remarks | Int (1-3) | FREQUENCY Lower (MHz) | Upper (MHz) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| Day | | | | | | | | | | |
| 30 0434 | 1157 | POTS | 0434 E | 1157 E | I | S | 1 | 110U | 170U | |
| | | POTS | 1058.6 | 1058.8 | III | B | 1 | 40X | 90U | |
| 0451 | 1704 | ONDR | 1213.0 | 1221.2 | DCIM | G | 1 | 1025 | 2000X | |
| | | ONDR | 1213.2 | 1220.5 | DCIM | G | 1 | 2000X | 4385X | |
| | | SGMR | 1542.0 | 1543.0 | III | | 1 | 30 | 60 | |
| | | SVTO | 1542.0 | 1545.0 | III | | 2 | 35 | 85 | |
| | | PALE | 1939.0 | 1940.0 | III | | 1 | 39 | 53 | |
| | | SGMR | 1939.0 | 1940.0 | III | | 1 | 30 | 55 | |
| 1940 | 2400 | HIRA | | | | | | | | |
| 2045 | 2400 | CULG | | | | | | | | |

Event Remarks:
- B = Single burst
- C = Underlyling continuum (particularly with Type I)
- DC = Drifting chains
- DP = Drifting pairs
- FN = Fundamental emission (Type II)
- FS = Fine structures (Type IV) (includes fiber, pulsations, zebra)
- G = Small group of bursts (<10)
- GG = Large group of bursts (>10)
- H = Herringbone
- HARM = Harmonic
- N = Intermittent activity in this period
- MOV = Moving (Type IV)
- MWB = Meter wave burst
- RS = Reverse slope burst
- S = Storm in the sense of intermittent but apparently connected actively
- SH = Secondary harmonic emission
- STA = Stationary (Type IV)
- U = U-shaped burst of Type III
- UE = Uncertain emission (Type II)
- W = Weak

Frequency qualifiers:
- X = Extends beyond instrument range
- U = Uncertain frequency

Remarks:
- SWF = Associated short wave fade observed
- FLA = Associated flare observed (class optional)
- ESS = Estimated shock speed in km/s (Type II)

Stations Reporting:
BLEN = Bleien, CULG = Culgoora, HIRA = Hiraiso, IZMI = Izmiran, LEAR = Learmonth, ONDR = Ondrejov, PALE = Palehua, POTS = Potsdam, SGMR = Sagamore Hill, SVTO = San Vito

# SOLAR RADIO NOISE STORM AT 164 MHZ FROM NANCAY RADIOHELIOGRAPH

## APRIL 1999

| | HELIOGRAPHICS POSITIONS MEAN VALUES[1] | | IMP[2] | OBSERVING TIME[3] | |
|---|---|---|---|---|---|
| DAY | E-W | S-N | | START( UT) | END(UT) |
| 01/04/99 | +0.48 | +0.08 | I | 10H47 | 15H24 D |
| 04/04/99 | +0.08 | -0.36 | III | 8H35 E | 15H23 D |
| 05/04/99 | -0.62 | +0.37 | I | 8H58 E | 15H23 D |
| 05/04/99 | +0.59 | -0.39 | I | 8H58 E | 15H23 D |
| 06/04/99 | -0.31 | +0.50 | I | 8H29 E | 15H22 D |
| 06/04/99 | +0.82 | -0.37 | II | 8H29 E | 15H22 D |
| 07/04/99 | +1.12 | -0.57 | III | 9H07 E | 15H22 D |
| 08/04/99 | +0.31 | +0.33 | I | 8H23 E | 15H22 D |
| 08/04/99 | +0.79 | -1.12 | I | 8H23 E | 15H22 D |
| 08/04/99 | +1.32 | -0.57 | I | 8H23 E | 15H22 D |
| 09/04/99 | -0.51 | -0.14 | I | 8H30 E | 15H22 D |
| 09/04/99 | +1.43 | -0.53 | I | 8H30 E | 15H22 D |
| 10/04/99 | +1.24 | -0.87 | I | 8H35 E | 15H21 D |
| 14/04/99 | -1.07 | -0.28 | I | 8H38 E | 15H21 D |
| 15/04/99 | -0.99 | -0.28 | III | 9H54 E | 15H16 D |
| 16/04/99 | -0.85 | -0.26 | II | 9H43 E | 15H20 D |
| 17/04/99 | -1.07 | -0.33 | I | 11H00 E | 15H20 D |
| 17/04/99 | +0.67 | +0.53 | I | 11H00 E | 15H20 D |
| 18/04/99 | -1.04 | -0.17 | I | 8H28 E | 15H20 D |
| 19/04/99 | -0.79 | -0.19 | II | 9H45 E | 15H19 D |
| 19/04/99 | +0.99 | +0.40 | II | 13H57 | 15H19 D |
| 20/04/99 | -0.54 | -0.14 | I | 8H20 E | 15H19 D |
| 21/04/99 | -0.29 | -0.20 | IV | 8H42 E | 15H04 D |
| 22/04/99 | -0.09 | -0.25 | III | 8H33 E | 14H57 D |
| 23/04/99 | +0.14 | -0.11 | III | 8H33 E | 15H19 D |
| 23/04/99 | +1.35 | -0.79 | II | 8H33 E | 15H19 D |
| 24/04/99 | +0.12 | +0.37 | II | 8H33 E | 15H19 D |
| 24/04/99 | +0.37 | -0.08 | II | 8H33 E | 15H19 D |
| 25/04/99 | +0.62 | -0.12 | I | 8H45 E | 15H18 D |
| 26/04/99 | -0.45 | +0.71 | I | 8H29 E | 14H57 D |
| 26/04/99 | +0.79 | -0.09 | I | 8H29 E | 14H57 D |
| 28/04/99 | -0.19 | +0.25 | I | 8H25 E | 12H05 |
| 28/04/99 | +0.06 | +0.73 | II | 11H08 | 13H10 |

[1] POSITIVE E-W AND S-N COORDINATES CORRESPOND TO THE N-W QUADRANT

[2] IMP1: FLUX< 5 SFU IMP2: 5< FLUX < 20 SFU IMP3: 20< FLUX <100 SFU
IMP4: 100< FLUX <300 SFU IMP5> 300 SFU

[3] E NOISE STORM IN PROGRESS AT THE BEGINNING OF THE NANCAY OBSERVATIONS
D NOISE STORM IN PROGRESS AT THE END OF THE NANCAY OBSERVATIONS

# SOLAR RADIO NOISE STORM AT 327 MHZ
# FROM NANCAY RADIOHELIOGRAPH
# APRIL 1999

| | HELIOGRAPHICS POSITIONS MEAN VALUES[1] | | IMP[2] | OBSERVING TIME[3] | |
|---|---|---|---|---|---|
| DAY | E-W | S-N | | START(UT) | END(UT) |
| 04/04/99 | +0.16 | -0.33 | II | 8H35 E | 15H23 D |
| 05/04/99 | +0.51 | -0.31 | I | 8H58 E | 15H23 D |
| 06/04/99 | -0.29 | +0.36 | I | 8H29 E | 15H22 D |
| 06/04/99 | +0.70 | -0.47 | I | 8H29 E | 15H22 D |
| 07/04/99 | -0.12 | +0.36 | I | 9H07 E | 15H22 D |
| 07/04/99 | +0.99 | -0.53 | I | 9H07 E | 15H22 D |
| 08/04/99 | +0.23 | +0.33 | I | 8H23 E | 15H22 D |
| 08/04/99 | +1.18 | -0.48 | I | 8H23 E | 15H22 D |
| 09/04/99 | -0.57 | -0.14 | II | 8H30 E | 15H22 D |
| 09/04/99 | -0.26 | -0.16 | II | 8H30 E | 15H22 D |
| 09/04/99 | +1.21 | -0.53 | I | 8H30 E | 12H20 |
| 10/04/99 | +0.57 | -0.40 | I | 8H35 E | 15H21 D |
| 14/04/99 | -1.01 | -0.28 | I | 8H38 E | 15H21 D |
| 14/04/99 | +0.28 | -0.22 | I | 8H38 E | 15H21 D |
| 15/04/99 | -0.90 | -0.29 | I | 9H54 E | 15H16 D |
| 16/04/99 | -1.15 | -0.20 | I | 9H43 E | 15H20 D |
| 16/04/99 | -0.81 | -0.31 | I | 9H43 E | 15H20 D |
| 16/04/99 | +0.39 | +0.51 | I | 12H45 | 15H20 D |
| 17/04/99 | -1.05 | -0.33 | I | 11H00 E | 13H00 |
| 17/04/99 | +0.60 | +0.56 | I | 11H00 E | 15H20 D |
| 18/04/99 | -0.91 | -0.28 | I | 8H28 E | 15H20 D |
| 19/04/99 | -0.76 | -0.20 | I | 9H45 E | 15H19 D |
| 19/04/99 | +1.02 | +0.40 | III | 13H59 | 15H19 D |
| 20/04/99 | -0.53 | -0.11 | I | 8H20 E | 15H19 D |
| 20/04/99 | +1.04 | +0.39 | I | 8H20 E | 15H19 D |
| 21/04/99 | -0.27 | -0.16 | III | 8H42 E | 15H04 D |
| 22/04/99 | -0.05 | -0.20 | III | 8H33 E | 14H57 D |
| 23/04/99 | +0.14 | -0.17 | I | 8H33 E | 15H19 D |
| 24/04/99 | +0.37 | -0.12 | I | 8H33 E | 15H19 D |
| 25/04/99 | -0.81 | +0.51 | I | 8H45 E | 15H18 D |
| 25/04/99 | +0.54 | -0.08 | I | 8H45 E | 15H18 D |
| 26/04/99 | -0.62 | +0.54 | I | 8H29 E | 14H57 D |
| 26/04/99 | +0.78 | -0.14 | I | 8H29 E | 14H57 D |
| 27/04/99 | -0.33 | +0.67 | I | 8H22 E | 15H18 D |
| 28/04/99 | -0.19 | +0.67 | I | 8H25 E | 15H18 D |
| 28/04/99 | +0.06 | +0.76 | I | 8H25 E | 15H18 D |
| 29/04/99 | +0.11 | +0.71 | I | 9H02 E | 15H18 D |

11 APRIL 1999: NO DATA

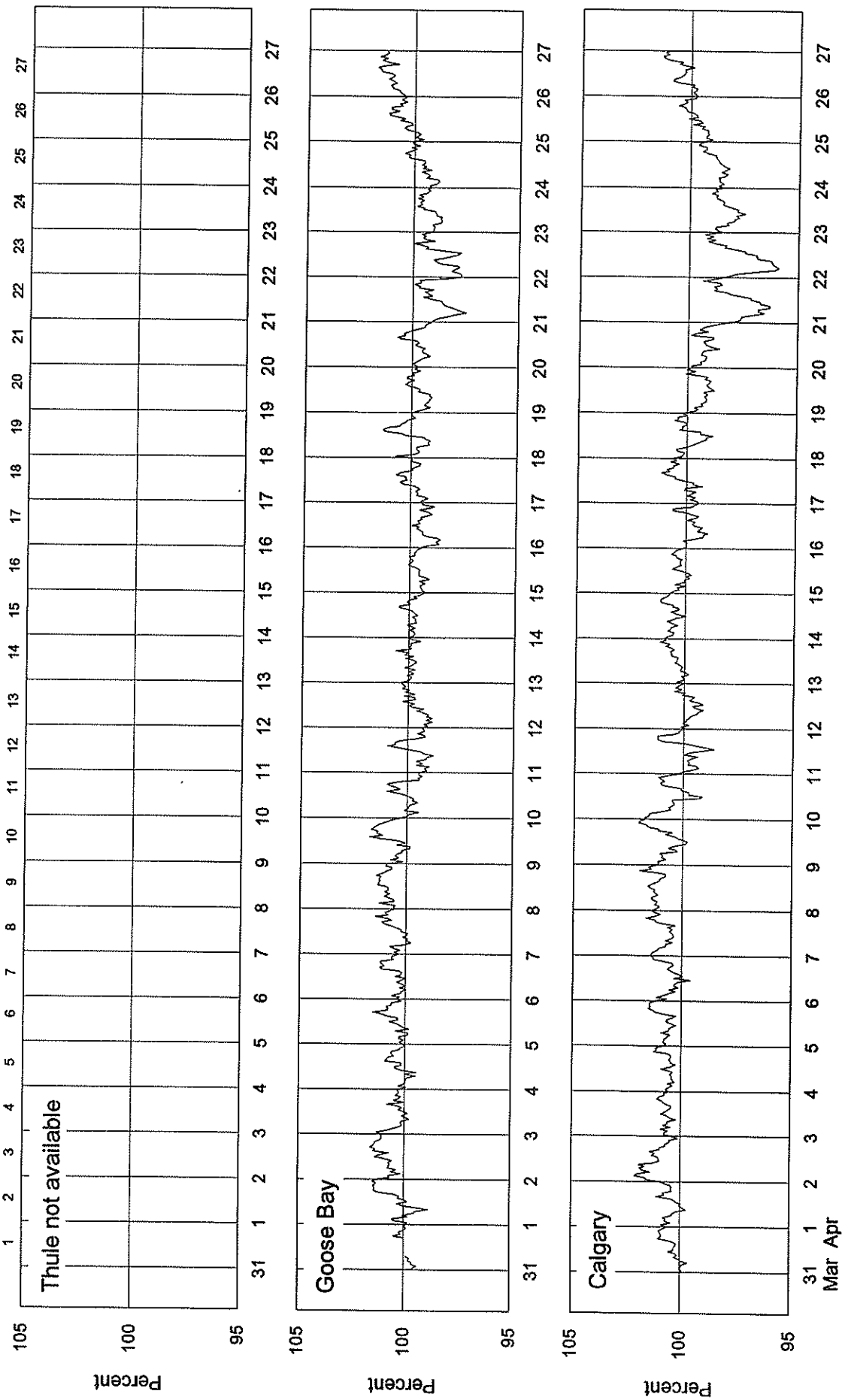
OTHERS DAYS: NO DETECTABLE NOISE STORM

# COSMIC RAY INDICES
## (Neutron Monitor)
### April 1999

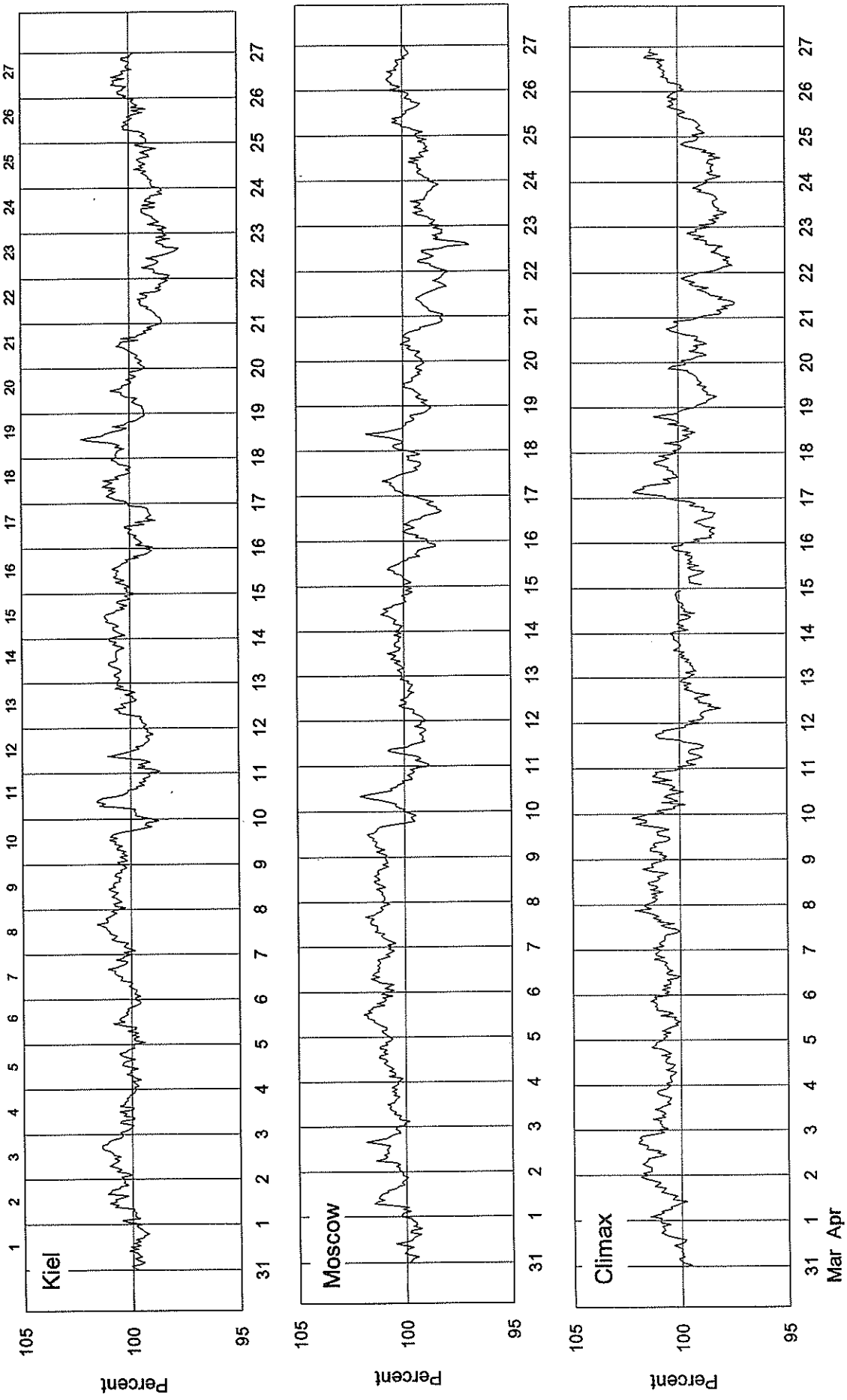
| Day | THULE Average (cts/h)/100 | GOOSE BAY Average (cts/h)/100 | CALGARY Average (cts/h)/300 | KIEL Average (cts/h)/100 | MOSCOW Average (cts/h)/64 | CLIMAX Average (cts/h)/100 | BEIJING Average (cts/h)/256 | HALEAKALA Average (cts/h)/1000 |
|---|---|---|---|---|---|---|---|---|
| 1 | No data | 7071.2 | 3853.5 | 6087.5 | 8976.5 | 4116.8 | 2025.8 | 3549.7 |
| 2 | at time of | 7115.0 | 3883.5 | 6111.3 | 9000.1 | 4145.4 | 2028.1 | 3557.0 |
| 3 | publication | 7068.7 | 3863.0 | 6076.2 | 8971.6 | 4118.7 | 2017.2 | 3532.6 |
| 4 | | 7062.5 | 3859.3 | 6066.8 | 9003.0 | 4110.9 | 2009.8 | 3522.7 |
| 5 | | 7077.4 | 3868.3 | 6065.9 | 9043.3 | 4114.0 | 2010.5 | 3522.6 |
| 6 | | 7079.7 | 3856.7 | 6079.8 | 9027.0 | 4111.2 | 2004.6 | 3517.6 |
| 7 | | 7079.8 | 3870.3 | 6109.2 | 9035.6 | 4122.0 | 2005.5 (20) | 3533.2 |
| 8 | | 7112.1 | 3885.2 | 6101.4 | 9030.1 | 4132.9 | 2003.3 | 3533.8 |
| 9 | | 7100.5 | 3868.0 | 6077.5 | 9008.3 | 4130.0 | 1994.5 | 3527.8 |
| 10 | | 7047.0 | 3860.5 | 6068.0 | 8966.1 | 4108.2 | 1985.7 | 3519.1 |
| 11 | | 7014.7 | 3833.5 | 6034.1 | 8881.5 | 4076.4 | 1986.2 | 3516.3 |
| 12 | | 7017.9 | 3828.3 | 6063.3 | 8907.3 | 4048.5 | 1987.9 | 3503.5 |
| 13 | | 7041.6 | 3851.0 | 6102.7 | 8958.5 | 4074.9 | 1990.0 | 3513.3 |
| 14 | | 7037.2 | 3861.3 | 6102.1 | 8957.5 | 4080.1 | 1989.3 | 3518.0 |
| 15 | | 7018.0 | 3847.3 | 6073.0 | 8910.7 | 4063.3 | 1982.9 | 3515.8 |
| 16 | | 6994.0 | 3826.7 | 6035.3 | 8856.2 | 4038.7 | 1970.6 | 3511.6 |
| 17 | | 7037.2 | 3843.3 | 6099.2 | 8925.3 | 4117.7 | 1996.9 | 3552.7 |
| 18 | | 7048.9 | 3835.2 | 6098.9 | 8931.6 | 4083.7 | 1979.5 | 3539.1 |
| 19 | | 7020.8 | 3811.7 | 6057.3 | 8873.5 | 4046.5 | 1974.0 | 3523.2 |
| 20 | | 7028.4 | 3808.2 | 6044.2 | 8870.2 | 4063.2 | 1977.1 | 3522.2 |
| 21 | | 6965.8 | 3747.8 | 5995.9 | 8807.4 | 4025.4 | 1969.7 | 3506.2 |
| 22 | | 6952.3 | 3744.5 | 5975.1 | 8786.7 | 4018.1 | 1961.2 | 3504.6 |
| 23 | | 6992.6 | 3773.7 | 5995.0 | 8831.0 | 4019.5 | 1963.9 | 3502.8 |
| 24 | | 7018.5 | 3789.8 | 6016.3 | 8853.3 | 4030.6 | 1961.2 | 3515.0 |
| 25 | | 7077.2 | 3826.5 | 6046.2 | 8908.0 | 4070.3 | 1964.9 | 3518.9 |
| 26 | | 7127.2 | 3852.0 | 6080.4 | 8954.7 | 4110.8 | 1980.7 | 3538.4 |
| 27 | | 7083.7 | 3844.0 | 6052.2 | 8928.1 | 4073.0 | 1985.2 | 3524.9 |
| 28 | | 7107.2 | 3852.8 | 6061.5 | 8972.7 | 4094.7 | 1988.0 | 3534.3 |
| 29 | | 7045.2 | 3827.5 | 6046.6 | 8963.4 | 4078.4 | 1971.8 | 3516.2 |
| 30 | | 7057.6 | 3809.2 | 6045.5 | 8979.6 | 4077.2 | 1969.0 | 3515.9 |
| 31 | | | | | | | | |
| Mean | | 7050.0 | 3836.1 | 6062.3 | 8937.3 | 4083.4 | 1987.8 | 3523.6 |

For less than 24-hour coverage, parentheses enclose the number of hours for which data are available. For Climax, parentheses enclose the number of section hours whenever the sum of both sections falls below 40 hours, and for Haleakala, whenever the sum of all three sections falls below 60 hours.

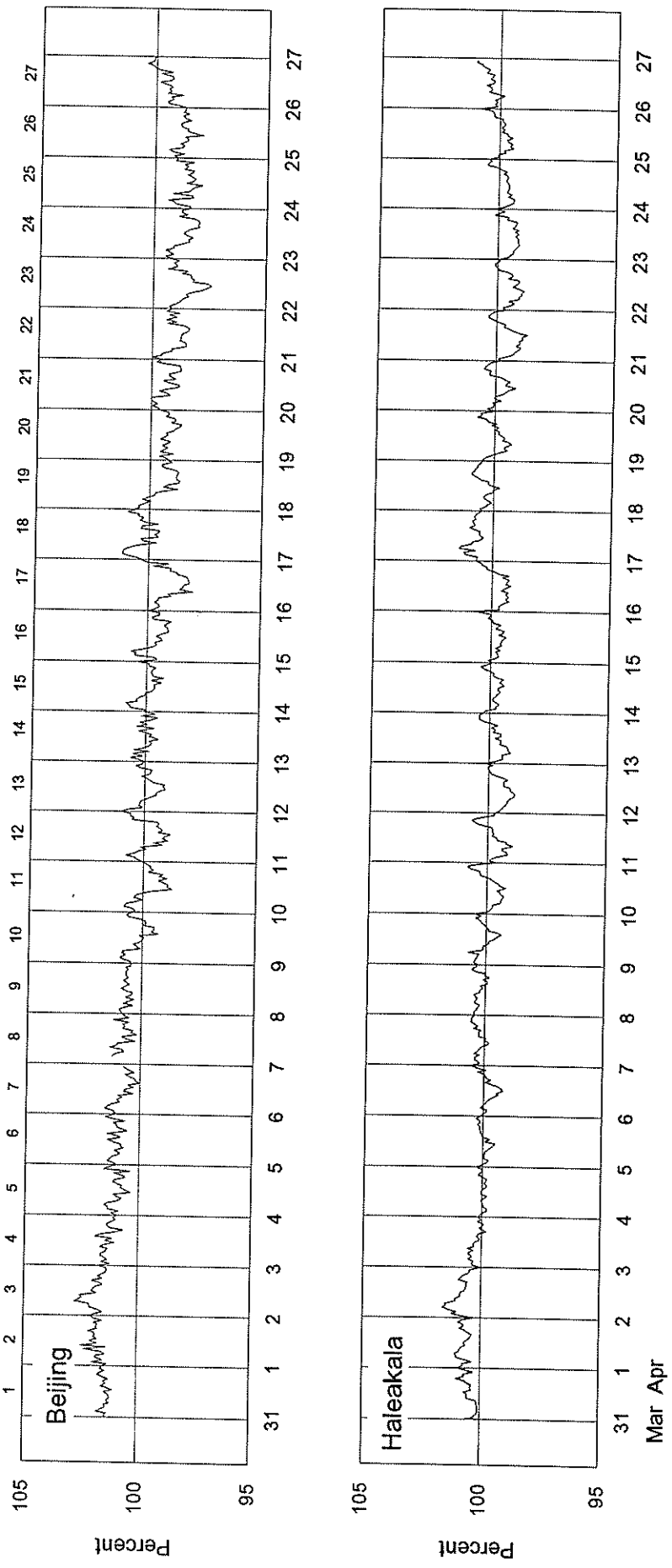
# COSMIC RAY INDICES
## (Neutron Monitor)
Bartels Rotation 2262 - Beginning 31 Mar 99



# COSMIC RAY INDICES
## (Neutron Monitor)
Bartels Rotation 2262 - Beginning 31 Mar 99

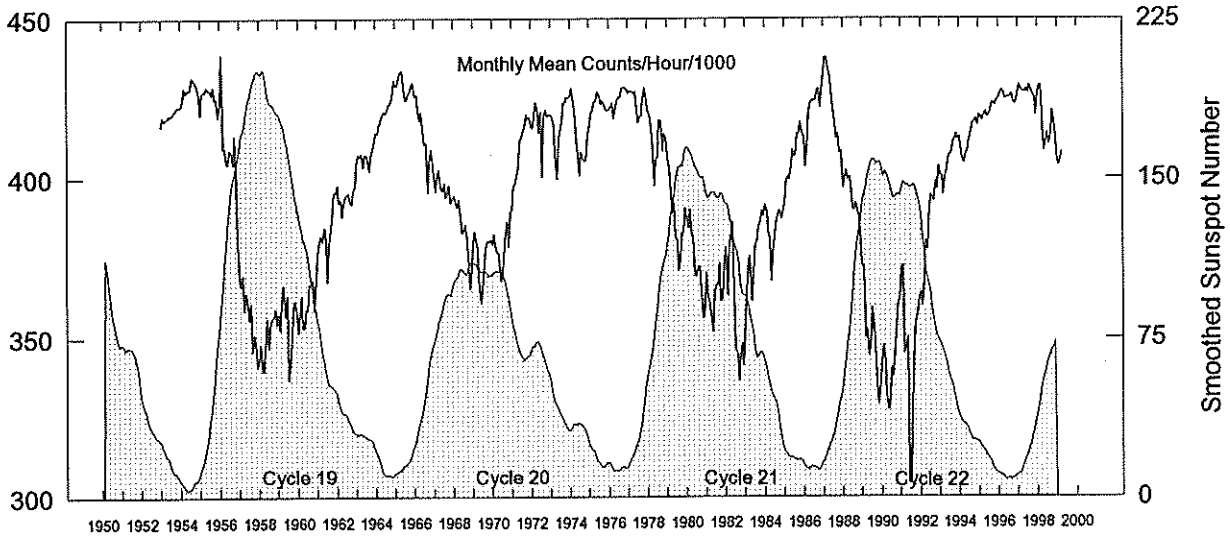


# COSMIC RAY INDICES
## (Neutron Monitor)
Bartels Rotation 2262 - Beginning 31 Mar 99



# Climax Neutron Monitor Pressure-Corrected Values
# Jan 1953 - Apr 1999






| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1953 | 4165 | 4193 | 4182 | 4188 | 4190 | 4200 | 4197 | 4205 | 4208 | 4216 | 4225 | 4226 | 4200 |
| 1954 | 4225 | 4247 | 4285 | 4269 | 4280 | 4277 | 4284 | 4318 | 4308 | 4303 | 4286 | 4269 | 4279 |
| 1955 | 4200 | 4267 | 4272 | 4273 | 4287 | 4278 | 4279 | 4263 | 4286 | 4245 | 4252 | 4193 | 4258 |
| 1956 | 4234 | 4388 | 4097 | 4097 | 4049 | 4045 | 4088 | 4083 | 4044 | 4134 | 3980 | 3799 | 4087 |
| 1957 | 3677 | 3660 | 3695 | 3585 | 3640 | 3603 | 3557 | 3606 | 3458 | 3509 | 3484 | 3410 | 3574 |
| 1958 | 3435 | 3479 | 3400 | 3396 | 3490 | 3560 | 3467 | 3537 | 3561 | 3564 | 3589 | 3542 | 3502 |
| 1959 | 3573 | 3526 | 3606 | 3664 | 3567 | 3633 | 3367 | 3420 | 3484 | 3597 | 3615 | 3587 | 3553 |
| 1960 | 3516 | 3573 | 3631 | 3532 | 3534 | 3589 | 3587 | 3670 | 3670 | 3682 | 3586 | 3681 | 3604 |
| 1961 | 3761 | 3801 | 3819 | 3800 | 3843 | 3838 | 3675 | 3784 | 3834 | 3870 | 3955 | 3950 | 3828 |
| 1962 | 3977 | 3922 | 3931 | 3878 | 3927 | 3940 | 3950 | 3954 | 3924 | 3919 | 3963 | 3971 | 3938 |
| 1963 | 4049 | 4073 | 4065 | 4077 | 4033 | 4075 | 4072 | 4060 | 4024 | 4066 | 4094 | 4111 | 4067 |
| 1964 | 4144 | 4139 | 4168 | 4181 | 4198 | 4208 | 4202 | 4213 | 4232 | 4240 | 4254 | 4307 | 4207 |
| 1965 | 4294 | 4290 | 4314 | 4335 | 4340 | 4288 | 4247 | 4246 | 4267 | 4271 | 4294 | 4300 | 4291 |
| 1966 | 4258 | 4262 | 4211 | 4180 | 4207 | 4146 | 4108 | 4112 | 3956 | 4055 | 4091 | 4053 | 4137 |
| 1967 | 3991 | 3960 | 4014 | 4025 | 3974 | 3960 | 3985 | 3939 | 3955 | 3980 | 3922 | 3933 | 3970 |
| 1968 | 3946 | 3925 | 3909 | 3932 | 3895 | 3830 | 3830 | 3853 | 3817 | 3761 | 3652 | 3685 | 3836 |
| 1969 | 3801 | 3831 | 3798 | 3782 | 3656 | 3609 | 3652 | 3730 | 3781 | 3803 | 3798 | 3807 | 3754 |
| 1970 | 3792 | 3824 | 3781 | 3765 | 3765 | 3679 | 3684 | 3755 | 3832 | 3862 | 3786 | 3895 | 3785 |
| 1971 | 3898 | 3975 | 3981 | 4003 | 4032 | 4124 | 4124 | 4152 | 4156 | 4200 | 4184 | 4192 | 4085 |
| 1972 | 4162 | 4157 | 4209 | 4237 | 4215 | 4141 | 4207 | 4005 | 4198 | 4214 | 4198 | 4198 | 4178 |
| 1973 | 4200 | 4193 | 4173 | 4075 | 3997 | 4119 | 4150 | 4180 | 4235 | 4240 | 4255 | 4253 | 4173 |
| 1974 | 4261 | 4283 | 4237 | 4207 | 4121 | 4077 | 4009 | 4083 | 4061 | 4054 | 4058 | 4140 | 4133 |
| 1975 | 4155 | 4206 | 4210 | 4239 | 4244 | 4271 | 4262 | 4231 | 4243 | 4231 | 4218 | 4213 | 4227 |
| 1976 | 4216 | 4223 | 4236 | 4188 | 4218 | 4244 | 4254 | 4253 | 4283 | 4287 | 4285 | 4280 | 4247 |
| 1977 | 4268 | 4272 | 4274 | 4267 | 4272 | 4231 | 4175 | 4193 | 4197 | 4245 | 4284 | 4260 | 4245 |
| 1978 | 4213 | 4198 | 4173 | 4107 | 3976 | 4058 | 4068 | 4183 | 4180 | 4085 | 4139 | 4128 | 4126 |
| 1979 | 4071 | 4034 | 3983 | 3888 | 3920 | 3814 | 3806 | 3710 | 3745 | 3829 | 3829 | 3905 | 3878 |
| 1980 | 3873 | 3842 | 3900 | 3819 | 3817 | 3697 | 3692 | 3719 | 3723 | 3647 | 3564 | 3564 | 3738 |
| 1981 | 3703 | 3623 | 3616 | 3561 | 3518 | 3643 | 3663 | 3662 | 3732 | 3613 | 3624 | 3726 | 3640 |
| 1982 | 3780 | 3634 | 3778 | 3819 | 3860 | 3650 | 3463 | 3456 | 3364 | 3444 | 3482 | 3413 | 3595 |
| 1983 | 3550 | 3643 | 3744 | 3753 | 3613 | 3700 | 3789 | 3798 | 3845 | 3860 | 3897 | 3881 | 3756 |
| 1984 | 3915 | 3896 | 3830 | 3806 | 3677 | 3773 | 3813 | 3865 | 3891 | 3897 | 3871 | 3890 | 3844 |
| 1985 | 3919 | 3985 | 4002 | 3995 | 4026 | 4088 | 4066 | 4075 | 4139 | 4139 | 4174 | 4141 | 4062 |
| 1986 | 4128 | 4036 | 4098 | 4199 | 4232 | 4242 | 4243 | 4244 | 4277 | 4280 | 4221 | 4277 | 4206 |
| 1987 | 4331 | 4376 | 4378 | 4346 | 4323 | 4254 | 4216 | 4170 | 4123 | 4139 | 4080 | 4084 | 4235 |
| 1988 | 3970 | 3997 | 4024 | 3995 | 4005 | 3981 | 3906 | 3899 | 3923 | 3893 | 3886 | 3798 | 3940 |
| 1989 | 3731 | 3717 | 3500 | 3527 | 3446 | 3478 | 3594 | 3535 | 3467 | 3347 | 3291 | 3349 | 3499 |
| 1990 | 3432 | 3476 | 3424 | 3317 | 3275 | 3283 | 3406 | 3377 | 3450 | 3540 | 3608 | 3620 | 3434 |
| 1991 | 3719 | 3725 | 3451 | 3470 | 3501 | 3041 | 3062 | 3293 | 3482 | 3550 | 3570 | 3628 | 3458 |
| 1992 | 3639 | 3600 | 3684 | 3803 | 3776 | 3876 | 3945 | 3939 | 3928 | 3989 | 3966 | 4036 | 3848 |
| 1993 | 4011 | 4007 | 3947 | 4003 | 4028 | 4061 | 4075 | 4076 | 4113 | 4122 | 4138 | 4122 | 4059 |
| 1994 | 4130 | 4079 | 4058 | 4048 | 4076 | 4085 | 4117 | 4140 | 4173 | 4179 | 4187 | 4168 | 4120 |
| 1995 | 4198 | 4194 | 4180 | 4199 | 4208 | 4193 | 4198 | 4209 | 4235 | 4236 | 4228 | 4246 | 4210 |
| 1996 | 4249 | 4266 | 4276 | 4269 | 4252 | 4250 | 4254 | 4256 | 4264 | 4243 | 4231 | 4242 | 4254 |
| 1997 | 4273 | 4293 | 4278 | 4274 | 4268 | 4281 | 4268 | 4290 | 4278 | 4260 | 4255 | 4199 | 4268 |
| 1998 | 4270 | 4290 | 4291 | 4160 | 4087 | 4116 | 4142 | 4107 | 4141 | 4212 | 4175 | 4133 | 4177 |
| 1999 | 4056 | 4040 | 4057 | 4083 | | | | | | | | | 4059 |

Multiply table entries by 100 to obtain hourly counting rate. Climax, Colorado: N39, W106, Alt=3400 m, Cutoff Rigidity=2.99GV (1980).
NOTE: Data may differ from previously reported values due to subsequent cleanup of data and slight changes in the averaging algorithm. See http://astro.uchicago.edu/home/web/pyle/neutron.html for latest changes. Sunspot numbers are preliminary after Jun 98.

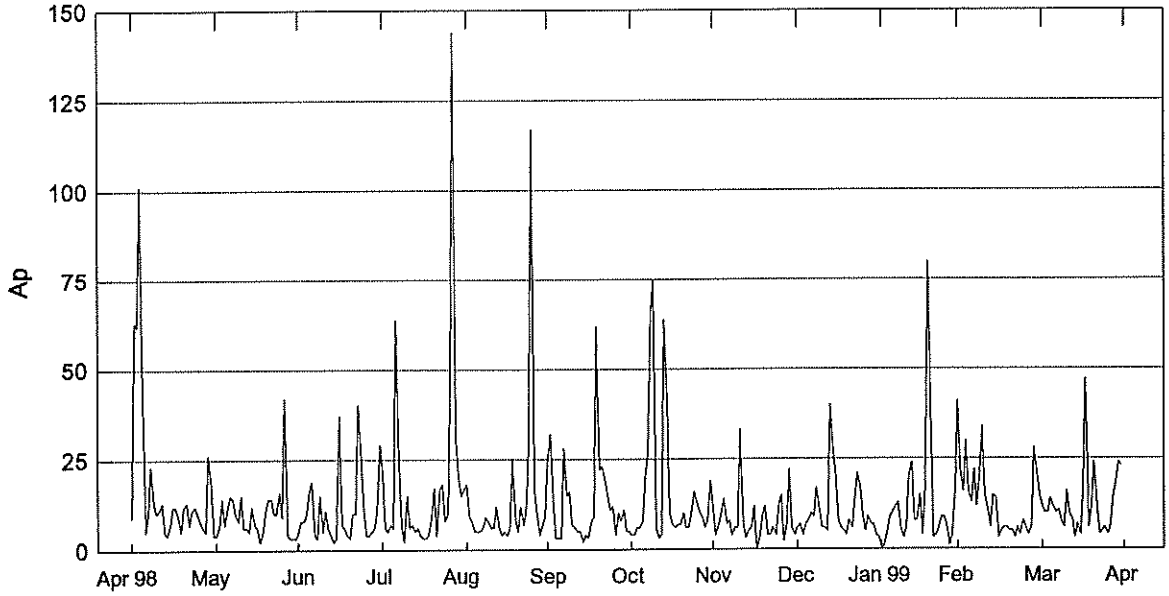
# Geomagnetic Activity Indices

## April 1999

| Day | | Kp Three-Hourly Indices 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | Ap | Cp | Km Three-Hourly Indices 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | aa Provisional Am | N | S | M | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 4+ | 4+ | 1+ | 1+ | 1 | 2+ | 1- | 1- | 16 | 12 | 0.7 | 3+ | 4- | 2- | 2- | 1- | 2o | 1o | 1o | 18 | 18 | 12 | 21 | 9 | |
| 2 | | 1+ | 3+ | 2+ | 1+ | 3- | 3- | 3+ | 1+ | 18+ | 10 | 0.6 | 1+ | 3o | 2+ | 2- | 3- | 2+ | 3o | 1+ | 18 | 21 | 15 | 18 | 18 | |
| 3 | | 2+ | 2+ | 2+ | 2 | 2- | 2- | 4- | 3- | 19- | 10 | 0.6 | 2o | 2o | 2+ | 3- | 2- | 1+ | 3+ | 3- | 19 | 25 | 19 | 20 | 24 | |
| 4 | | 3+ | 2+ | 2+ | 2- | 3 | 2 | 4 | 3+ | 22 | 14 | 0.8 | 3o | 2+ | 2+ | 2- | 3- | 2- | 3+ | 3+ | 24 | 28 | 19 | 16 | 32 | |
| 5 | | 3 | 2+ | 3+ | 3+ | 3- | 3 | 1 | 1- | 19+ | 12 | 0.7 | 2+ | 2o | 3o | 3+ | 3- | 3- | 1o | 1- | 20 | 22 | 20 | 24 | 18 | |
| 6 | | 3+ | 4 | 2- | 1 | 2- | 2- | 2- | 2- | 17- | 10 | 0.6 | 3o | 3+ | 2o | 1+ | 2+ | 2o | 1+ | 2- | 18 | 22 | 15 | 21 | 16 | |
| 7 | | 4- | 3 | 3- | 1+ | 2- | 2- | 3 | 2+ | 19+ | 11 | 0.6 | 4- | 2+ | 2o | 2o | 2+ | 2- | 3o | 2+ | 21 | 26 | 20 | 23 | 23 | |
| 8 | | 1- | 1 | 1+ | 1 | 2 | 4 | 2+ | 2 | 14+ | 8 | 0.4 | 1- | 1o | 2- | 2- | 2+ | 4- | 2o | 2o | 16 | 16 | 16 | 8 | 25 | |
| 9 | Q7 | 2 | 2+ | 1 | 1- | 1 | 2+ | 2- | 1- | 12- | 6 | 0.3 | 2o | 2o | 1o | 1o | 1+ | 2o | 1+ | 1o | 10 | 14 | 12 | 13 | 13 | C |
| 10 | | 2- | 3- | 4- | 2+ | 4- | 3+ | 3 | 4- | 24 | 16 | 0.9 | 1+ | 3- | 3+ | 3- | 3o | 3o | 3o | 4- | 27 | 38 | 26 | 27 | 37 | |
| 11 | | 3 | 3 | 3 | 2+ | 2 | 2+ | 1 | 1 | 18- | 10 | 0.5 | 2+ | 3- | 3- | 3- | 2+ | 3- | 1o | 1+ | 18 | 19 | 23 | 25 | 16 | |
| 12 | | 4- | 2- | 1 | 3 | 1+ | 1+ | 1- | 0+ | 13 | 8 | 0.4 | 3+ | 1+ | 1o | 3o | 1+ | 1+ | 1o | 1- | 13 | 18 | 13 | 23 | 9 | K |
| 13 | Q1 | 0 | 0 | 1- | 1+ | 1- | 1+ | 1- | 1+ | 6 | 3 | 0.1 | 0o | 0+ | 1- | 1o | 1- | 1+ | 1- | 1+ | 5 | 8 | 5 | 4 | 9 | CK |
| 14 | Q10A | 1+ | 1- | 3 | 3 | 1 | 2- | 2- | 1 | 13+ | 7 | 0.4 | 1+ | 1+ | 3o | 2+ | 1o | 2- | 1+ | 1o | 12 | 14 | 13 | 17 | 10 | K |
| 15 | Q2 | 1+ | 0+ | 1 | 1+ | 0+ | 1- | 1 | 1 | 7 | 4 | 0.1 | 1o | 0+ | 1o | 1+ | 0+ | 0+ | 1- | 1+ | 5 | 7 | 7 | 8 | 6 | CC |
| 16 | | 2- | 2 | 0+ | 3- | 4- | 4- | 4- | 5 | 23- | 18 | 1.0 | 1o | 1+ | 0+ | 2+ | 3+ | 3+ | 3+ | 4+ | 28 | 41 | 17 | 13 | 45 | |
| 17 | D1 | 6 | 7+ | 5+ | 5 | 2+ | 2+ | 3- | 2- | 33- | 47 | 1.5 | 6- | 7- | 5- | 4+ | 2+ | 2+ | 2+ | 2- | 67 | 68 | 33 | 82 | 19 | |
| 18 | Q9 | 3- | 2 | 1- | 2- | 2 | 1+ | 2 | 1 | 13+ | 6 | 0.3 | 3- | 2+ | 1o | 2- | 2o | 1+ | 2- | 1o | 12 | 14 | 10 | 13 | 11 | C |
| 19 | | 1- | 1+ | 2- | 4- | 3- | 2+ | 3+ | 3+ | 19 | 12 | 0.7 | 1- | 1o | 2- | 3o | 3- | 2o | 3- | 3+ | 19 | 20 | 22 | 16 | 26 | |
| 20 | D2 | 4- | 4- | 4+ | 4+ | 4+ | 4+ | 3- | 2+ | 30- | 24 | 1.2 | 4- | 3+ | 4o | 4o | 5- | 4- | 2+ | 2+ | 44 | 43 | 46 | 46 | 44 | |
| 21 | | 2- | 2 | 3- | 2+ | 2+ | 4+ | 3- | 1+ | 19+ | 12 | 0.7 | 1+ | 2o | 3- | 3o | 3o | 4- | 3o | 2- | 24 | 21 | 27 | 15 | 33 | |
| 22 | Q3 | 2- | 1 | 1- | 0+ | 1- | 1+ | 2- | 1 | 8+ | 4 | 0.1 | 2- | 1o | 0+ | 0+ | 0+ | 1+ | 2- | 1o | 7 | 9 | 6 | 7 | 9 | C |
| 23 | Q4 | 1- | 1 | 1+ | 2- | 2- | 2- | 1 | 1- | 10- | 5 | 0.2 | 1- | 1o | 2- | 2- | 2- | 1+ | 1o | 1- | 8 | 10 | 7 | 8 | 10 | CC |
| 24 | Q6 | 2+ | 2+ | 1+ | 1+ | 1 | 2- | 1 | 0+ | 11+ | 6 | 0.2 | 3- | 2+ | 2- | 2- | 1+ | 2- | 1o | 0+ | 12 | 10 | 8 | 11 | 8 | CC |
| 25 | Q5 | 0 | 0+ | 1 | 1 | 2- | 1+ | 1+ | 2+ | 9 | 4 | 0.2 | 0o | 0o | 1+ | 1- | 1+ | 1o | 1o | 2+ | 7 | 10 | 6 | 4 | 12 | CC |
| 26 | Q8 | 1+ | 0+ | 1- | 2+ | 2+ | 2+ | 2 | 1 | 12+ | 6 | 0.3 | 1+ | 0o | 1o | 2+ | 2o | 2+ | 2+ | 1+ | 12 | 15 | 11 | 11 | 15 | K |
| 27 | | 1 | 1 | 2 | 3- | 3- | 3 | 4+ | 4- | 20+ | 14 | 0.8 | 1- | 1- | 2+ | 3+ | 3- | 3- | 4- | 3+ | 24 | 28 | 26 | 20 | 35 | |
| 28 | D5* | 3 | 3- | 3- | 4 | 2+ | 3+ | 3+ | 5- | 26 | 19 | 1.0 | 3- | 2+ | 3o | 4- | 2+ | 3o | 3o | 5- | 35 | 43 | 30 | 27 | 46 | |
| 29 | D3 | 3 | 3+ | 2 | 4 | 4 | 4+ | 4 | 5- | 29+ | 24 | 1.2 | 3o | 3- | 2+ | 4- | 3+ | 4- | 3+ | 5o | 42 | 43 | 35 | 32 | 47 | |
| 30 | D4 | 4+ | 4- | 4 | 3+ | 3+ | 3 | 4- | 4 | 29+ | 23 | 1.1 | 5- | 4o | 4- | 3+ | 3o | 3o | 3o | 4- | 42 | 42 | 42 | 46 | 38 | |
| Mean | | | | | | | | | | | 12 | 0.61 | | | | | | | | | 20.9 | 23.8 | 18.8 | 21.3 | |

| Day | Kn Three-Hourly Indices 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | An | Ks Three-Hourly Indices 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | As | Sa | Prov Ri | Ra | Rs | IMF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4- | 4o | 2- | 2- | 1o | 2- | 1+ | 1+ | 20 | 3+ | 3+ | 2- | 2- | 0o | 2o | 1- | 1o | 16 | 102.9 | 44 | 43 | 49 | |
| 2 | 2- | 3o | 3- | 2- | 3- | 3- | 3o | 2- | 20 | 1+ | 3- | 2+ | 1+ | 3- | 2- | 3o | 1+ | 17 | 99.4 | 39 | 42 | 45 | |
| 3 | 2- | 2o | 2+ | 2+ | 2o | 2o | 3+ | 3- | 19 | 3- | 2o | 3- | 3- | 2- | 1o | 3+ | 3- | 19 | 102.7 | 48 | 59 | 49 | |
| 4 | 3- | 3- | 2+ | 2- | 3o | 2o | 3+ | 3o | 24 | 3+ | 2+ | 2o | 1+ | 2+ | 1+ | 3+ | 3+ | 22 | 116.0 | 71 | 71 | 63 | |
| 5 | 2+ | 2o | 3o | 3o | 3- | 3o | 1o | 1o | 20 | 3- | 2o | 3o | 3+ | 2+ | 2+ | 1o | 1- | 19 | 132.7 | 81 | 84 | 81 | |
| 6 | 3o | 3+ | 2- | 1+ | 2+ | 2+ | 2- | 2- | 19 | 3o | 3o | 2o | 2- | 2o | 1+ | 1+ | 1+ | 17 | 137.6 | 92 | 88 | 87 | |
| 7 | 3o | 2+ | 2o | 2+ | 2+ | 2- | 3+ | 2+ | 20 | 4o | 3- | 2+ | 2- | 2+ | 2- | 3- | 2+ | 22 | 141.7 | 82 | 84 | 91 | |
| 8 | 0+ | 1o | 2- | 2- | 3- | 4- | 2+ | 2+ | 18 | 1- | 1o | 2- | 2- | 2- | 4- | 2- | 2- | 14 | 139.5 | 89 | 86 | 89 | |
| 9 | 2- | 2- | 1o | 1- | 1+ | 2+ | 2- | 1o | 11 | 2o | 2+ | 1o | 1o | 1o | 1o | 1+ | 1o | 9 | 136.7 | 104 | 106 | 86 | |
| 10 | 2- | 3- | 4- | 2+ | 3+ | 3o | 3o | 4o | 30 | 1+ | 2+ | 3o | 3- | 3- | 3- | 3o | 3+ | 24 | 136.9 | 90 | 89 | 86 | |
| 11 | 2+ | 3- | 3o | 3- | 2+ | 3- | 1+ | 2- | 19 | 2+ | 3- | 3- | 3- | 2+ | 3- | 1o | 1+ | 18 | 131.3 | 75 | 85 | 80 | |
| 12 | 3o | 1+ | 1o | 3o | 2- | 2- | 1+ | 1o | 15 | 3+ | 1+ | 1o | 3- | 1o | 1o | 0+ | 0+ | 12 | 130.7 | 76 | 83 | 79 | |
| 13 | 0o | 0+ | 1- | 1+ | 1o | 2- | 1o | 2- | 7 | 0o | 0o | 0+ | 1- | 0+ | 1- | 0o | 1o | 3 | 130.3 | 81 | 74 | 79 | |
| 14 | 1+ | 1o | 3o | 3- | 1+ | 2o | 2- | 1+ | 14 | 1o | 2- | 3- | 2o | 1- | 1+ | 1o | 1- | 10 | 121.0 | 74 | 74 | 69 | |
| 15 | 1+ | 0o | 1o | 1+ | 0+ | 1o | 1+ | 2- | 7 | 1o | 0+ | 1o | 1+ | 0o | 0o | 0+ | 1o | 4 | 122.7 | 63 | 70 | 71 | |
| 16 | 1o | 1+ | 0o | 3- | 4o | 4o | 4- | 5o | 36 | 1o | 1+ | 1- | 2+ | 2+ | 3o | 3- | 4- | 19 | 123.8 | 67 | 69 | 72 | |
| 17 | 6- | 7- | 4o | 5- | 3- | 3- | 3o | 2- | 72 | 6o | 6+ | 5o | 4- | 2o | 2- | 2- | 1+ | 63 | 116.6 | 75 | 72 | 64 | |
| 18 | 2+ | 2+ | 1+ | 2- | 2+ | 2- | 2- | 1+ | 14 | 3- | 2o | 0+ | 1+ | 2- | 1o | 1+ | 1- | 11 | 113.8 | 55 | 50 | 61 | |
| 19 | 1o | 1o | 2- | 3+ | 2+ | 2o | 3o | 3o | 20 | 1- | 1o | 2- | 3o | 3- | 2o | 3- | 3+ | 18 | 110.9 | 50 | 55 | 58 | |
| 20 | 3o | 4- | 4o | 4o | 5o | 4o | 3- | 2+ | 48 | 4o | 3+ | 4- | 4- | 4+ | 4- | 2+ | 2o | 40 | 105.8 | 50 | 53 | 52 | |
| 21 | 1+ | 2+ | 3- | 3+ | 3+ | 4- | 3- | 2- | 27 | 1o | 2o | 3- | 2+ | 3- | 4- | 3o | 2- | 22 | 104.4 | 45 | 47 | 51 | |
| 22 | 2- | 1+ | 1- | 0+ | 1- | 2- | 2- | 1+ | 9 | 2- | 1- | 0o | 0o | 0o | 0+ | 1+ | 0+ | 4 | 101.4 | 40 | 47 | 48 | |
| 23 | 1o | 1+ | 2- | 2+ | 2o | 2- | 1+ | 1o | 11 | 0+ | 1o | 1+ | 1o | 1+ | 1+ | 1- | 0+ | 6 | 99.3 | 42 | 45 | 45 | |
| 24 | 2+ | 2+ | 2- | 2- | 1+ | 2o | 1o | 0+ | 12 | 3o | 3- | 1+ | 2- | 1o | 1o | 1o | 0o | 11 | 102.0 | 51 | 37 | 48 | |
| 25 | 0o | 0o | 1+ | 1+ | 2- | 2- | 2- | 3- | 10 | 0o | 0+ | 1o | 0+ | 0+ | 0+ | 0+ | 2- | 4 | 103.8 | 48 | 42 | 50 | |
| 26 | 2- | 0o | 1- | 3- | 3- | 3o | 2+ | 1+ | 15 | 1- | 0o | 1+ | 2- | 1+ | 2- | 2+ | 1o | 9 | 105.8 | 47 | 51 | 52 | |
| 27 | 1+ | 1- | 3- | 3+ | 3o | 3o | 4o | 3+ | 27 | 0+ | 1- | 2o | 3o | 2o | 2+ | 3+ | 4- | 21 | 110.0 | 55 | 60 | 57 | |
| 28 | 3- | 3- | 3+ | 4o | 2o | 3o | 3o | 4o | 34 | 2+ | 2+ | 3o | 3+ | 2+ | 3o | 3o | 5o | 36 | 111.3 | 55 | 61 | 58 | |
| 29 | 3- | 3- | 2- | 4- | 3+ | 4o | 4- | 4- | 36 | 3o | 3- | 3- | 4- | 3+ | 4- | 3+ | 6- | 48 | 123.9 | 61 | 63 | 72 | |
| 30 | 4- | 4- | 3+ | 3+ | 3o | 3o | 3+ | 4- | 37 | 5+ | 4+ | 4- | 3o | 3+ | 3- | 3- | 3+ | 46 | 125.3 | 66 | 68 | 73 | |
| Mean | | | | | | | | | 22.4 | | | | | | | | | 19.5 | 118.0 | 63.9 | 65.2 | 65.4 | |

# Daily Average Indices Ap
## May 1998 - Apr 1999

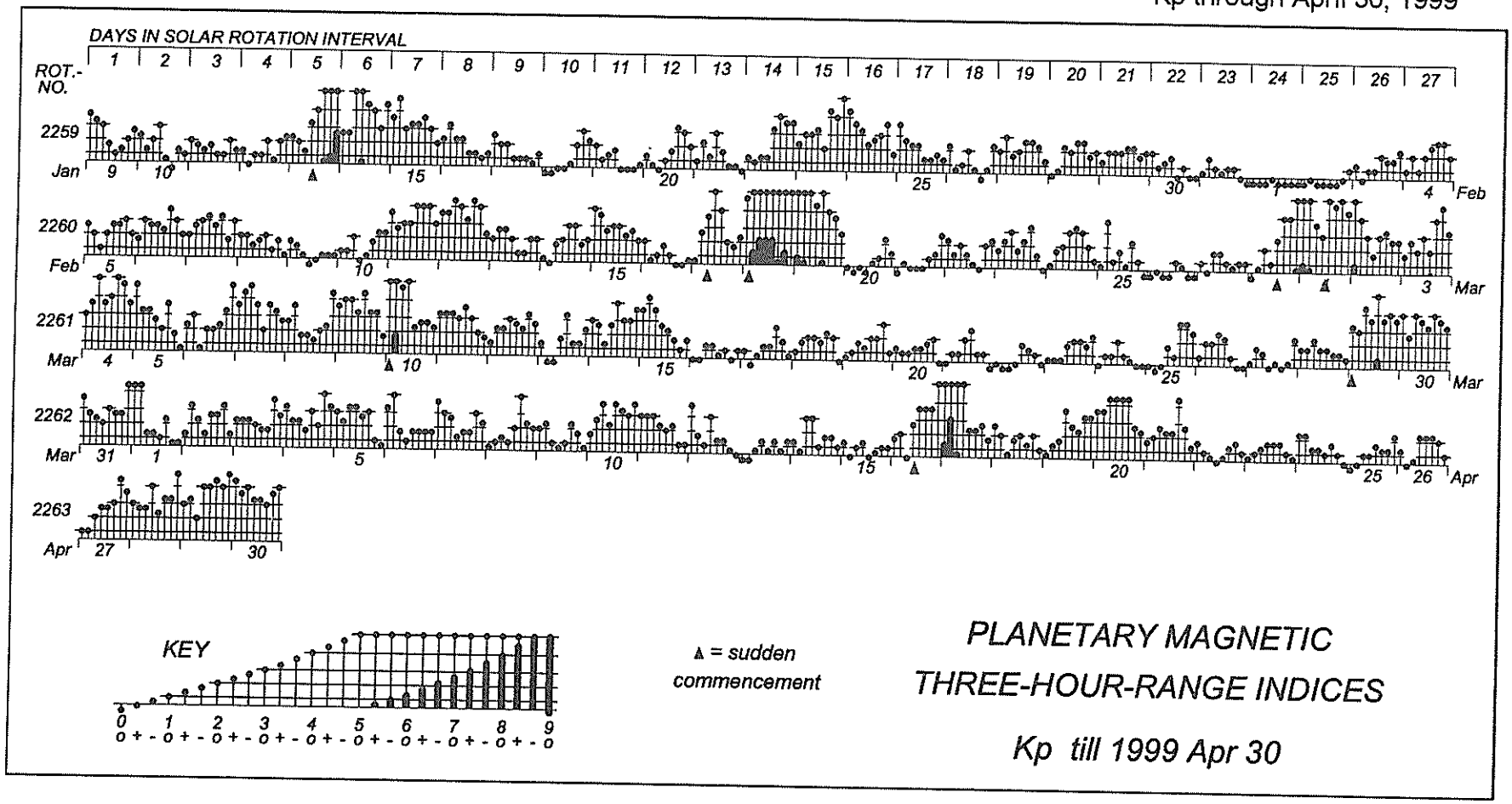



| Day | May 98 | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan 99 | Feb | Mar | Apr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 9 | 4 | 5 | 21 | 18 | 24 | 4 | 11 | 6 | 0 | 41 | 12 |
| 2 | 63 | 7 | 8 | 6 | 9 | 32 | 4 | 4 | 7 | 1 | 22 | 10 |
| 3 | 62 | 14 | 8 | 5 | 8 | 14 | 6 | 7 | 4 | 5 | 16 | 10 |
| 4 | 101 | 7 | 10 | 7 | 5 | 3 | 6 | 10 | 7 | 9 | 30 | 14 |
| 5 | 42 | 12 | 16 | 6 | 5 | 3 | 8 | 14 | 8 | 10 | 16 | 12 |
| 6 | 5 | 15 | 19 | 64 | 5 | 3 | 20 | 7 | 10 | 12 | 13 | 10 |
| 7 | 10 | 14 | 4 | 24 | 6 | 28 | 26 | 8 | 9 | 13 | 22 | 11 |
| 8 | 23 | 10 | 3 | 7 | 9 | 15 | 66 | 4 | 17 | 6 | 12 | 8 |
| 9 | 13 | 8 | 15 | 2 | 8 | 16 | 75 | 6 | 11 | 3 | 21 | 6 |
| 10 | 10 | 15 | 5 | 15 | 6 | 7 | 6 | 6 | 6 | 6 | 34 | 16 |
| 11 | 11 | 6 | 11 | 6 | 6 | 6 | 3 | 33 | 6 | 20 | 15 | 10 |
| 12 | 13 | 6 | 6 | 7 | 12 | 5 | 4 | 7 | 5 | 24 | 11 | 8 |
| 13 | 5 | 5 | 4 | 5 | 6 | 5 | 64 | 3 | 40 | 8 | 6 | 3 |
| 14 | 4 | 12 | 2 | 6 | 4 | 2 | 41 | 5 | 29 | 8 | 15 | 7 |
| 15 | 7 | 7 | 3 | 4 | 5 | 4 | 10 | 6 | 20 | 15 | 14 | 4 |
| 16 | 12 | 6 | 37 | 3 | 4 | 3 | 7 | 12 | 8 | 4 | 3 | 18 |
| 17 | 12 | 2 | 7 | 3 | 6 | 8 | 6 | 0 | 6 | 17 | 5 | 47 |
| 18 | 9 | 5 | 6 | 4 | 25 | 9 | 7 | 3 | 5 | 80 | 6 | 6 |
| 19 | 5 | 11 | 4 | 9 | 8 | 62 | 7 | 9 | 4 | 40 | 6 | 12 |
| 20 | 12 | 14 | 3 | 17 | 5 | 22 | 10 | 12 | 8 | 3 | 5 | 24 |
| 21 | 13 | 14 | 10 | 4 | 12 | 23 | 6 | 4 | 6 | 4 | 5 | 12 |
| 22 | 7 | 10 | 10 | 17 | 7 | 20 | 6 | 4 | 14 | 6 | 3 | 4 |
| 23 | 11 | 10 | 40 | 18 | 11 | 15 | 11 | 6 | 21 | 9 | 6 | 5 |
| 24 | 12 | 16 | 28 | 8 | 28 | 11 | 16 | 4 | 17 | 9 | 4 | 6 |
| 25 | 10 | 9 | 11 | 10 | 117 | 12 | 13 | 12 | 9 | 6 | 8 | 4 |
| 26 | 8 | 42 | 4 | 49 | 17 | 4 | 10 | 15 | 5 | 1 | 6 | 6 |
| 27 | 6 | 4 | 4 | 144 | 10 | 10 | 9 | 2 | 9 | 4 | 4 | 14 |
| 28 | 5 | 3 | 5 | 30 | 4 | 8 | 6 | 7 | 7 | 17 | 6 | 19 |
| 29 | 26 | 3 | 6 | 20 | 7 | 11 | 8 | 22 | 7 |  | 28 | 24 |
| 30 | 18 | 3 | 11 | 15 | 9 | 5 | 19 | 6 | 4 |  | 22 | 23 |
| 31 | 4 | 4 | 29 | 17 |  | 5 |  | 4 | 3 |  | 15 |  |
| Mean | 18 | 10 | 11 | 18 | 13 | 13 | 16 | 8 | 10 | 12 | 14 | 12 |

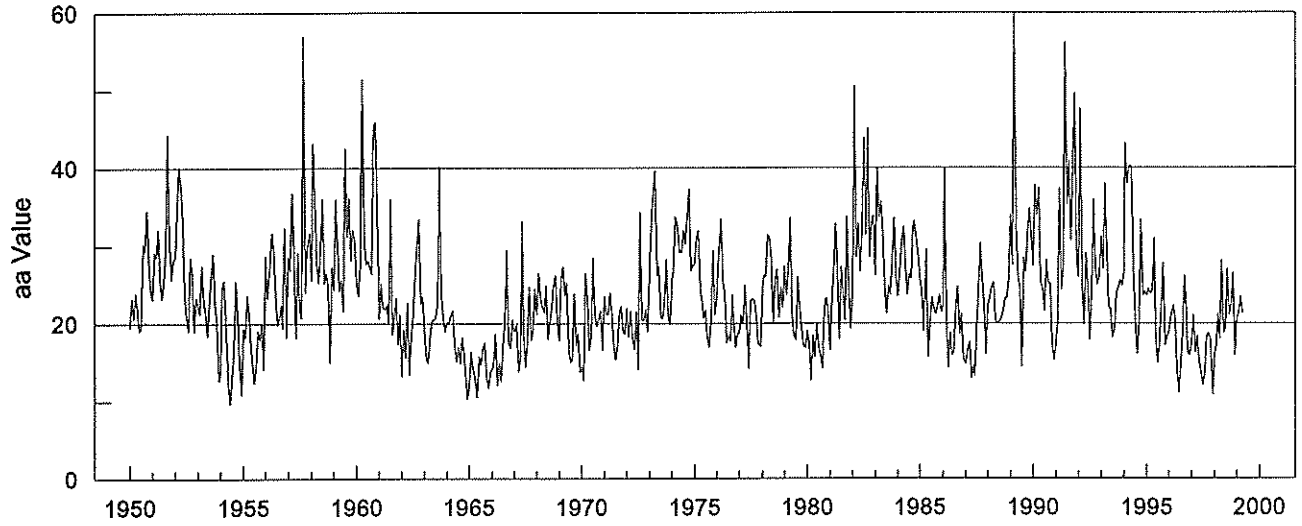
## PLANETARY 3-HOUR-RANGE INDICES (Kp) BY 27-DAY SOLAR ROTATION INTERVAL

GeoForschungsZentraum Potsdam

Kp through April 30, 1999



# Monthly Mean aa Index Jan 1950 - Apr 1999

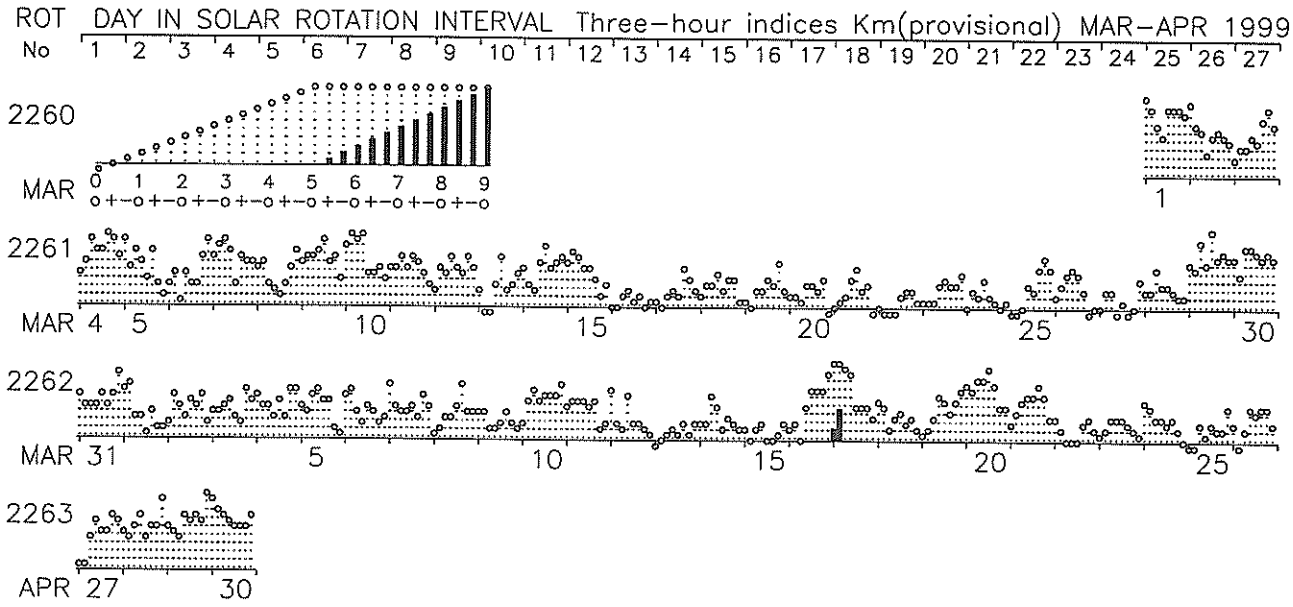



| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | 19.5 | 23.2 | 20.6 | 23.8 | 21.7 | 19.0 | 19.5 | 30.2 | 29.3 | 34.5 | 28.0 | 24.0 | 24.4 |
| 1951 | 23.1 | 29.2 | 28.5 | 32.1 | 25.5 | 23.2 | 25.2 | 29.7 | 44.4 | 30.3 | 25.7 | 28.2 | 28.8 |
| 1952 | 28.5 | 34.3 | 40.1 | 38.0 | 33.1 | 23.8 | 20.7 | 19.0 | 28.5 | 26.4 | 18.9 | 23.4 | 27.9 |
| 1953 | 22.3 | 21.2 | 27.4 | 22.7 | 21.4 | 18.4 | 22.5 | 26.1 | 29.0 | 22.4 | 20.2 | 12.6 | 22.2 |
| 1954 | 13.9 | 24.5 | 25.5 | 20.6 | 12.0 | 9.7 | 13.1 | 16.5 | 25.4 | 21.1 | 14.5 | 10.9 | 17.3 |
| 1955 | 19.3 | 18.2 | 23.6 | 21.1 | 16.7 | 15.1 | 12.3 | 14.3 | 19.1 | 17.8 | 19.9 | 14.1 | 17.6 |
| 1956 | 28.7 | 23.3 | 27.6 | 31.7 | 29.3 | 23.5 | 19.8 | 20.7 | 22.4 | 19.3 | 32.3 | 18.2 | 24.7 |
| 1957 | 28.7 | 26.8 | 36.7 | 28.8 | 18.1 | 29.1 | 21.7 | 20.7 | 57.0 | 24.0 | 29.5 | 31.7 | 29.4 |
| 1958 | 25.5 | 43.2 | 36.1 | 27.6 | 25.2 | 29.7 | 36.0 | 25.1 | 26.5 | 24.7 | 15.0 | 27.2 | 28.5 |
| 1959 | 24.3 | 35.9 | 29.9 | 24.2 | 25.7 | 21.6 | 42.5 | 31.2 | 36.1 | 28.2 | 32.1 | 30.8 | 30.2 |
| 1960 | 25.2 | 23.5 | 27.6 | 51.5 | 31.6 | 27.6 | 28.1 | 27.2 | 26.4 | 45.6 | 45.9 | 34.5 | 32.9 |
| 1961 | 20.6 | 25.1 | 22.0 | 21.8 | 22.3 | 20.1 | 36.0 | 18.5 | 20.7 | 23.3 | 17.3 | 21.1 | 22.4 |
| 1962 | 13.2 | 19.2 | 15.5 | 22.6 | 13.4 | 18.1 | 21.0 | 26.2 | 29.8 | 33.3 | 22.5 | 23.5 | 21.5 |
| 1963 | 19.3 | 15.3 | 14.9 | 18.2 | 20.4 | 20.5 | 20.8 | 22.5 | 40.2 | 23.5 | 20.7 | 18.9 | 21.3 |
| 1964 | 20.1 | 20.1 | 21.0 | 21.7 | 17.5 | 15.1 | 16.9 | 14.8 | 18.2 | 16.9 | 13.8 | 10.3 | 17.2 |
| 1965 | 11.8 | 16.3 | 14.3 | 12.6 | 10.5 | 15.7 | 14.7 | 16.8 | 17.5 | 13.1 | 11.7 | 13.8 | 14.1 |
| 1966 | 14.2 | 14.8 | 18.6 | 12.0 | 14.8 | 12.5 | 17.1 | 20.0 | 29.4 | 17.5 | 16.8 | 20.5 | 17.3 |
| 1967 | 18.9 | 19.8 | 13.8 | 15.5 | 33.1 | 18.6 | 14.4 | 17.5 | 24.7 | 17.8 | 18.9 | 24.5 | 19.8 |
| 1968 | 21.1 | 26.5 | 23.3 | 22.2 | 21.4 | 24.9 | 18.0 | 20.1 | 22.0 | 24.8 | 26.2 | 20.3 | 22.6 |
| 1969 | 17.8 | 25.8 | 27.3 | 23.6 | 25.2 | 16.7 | 15.0 | 15.3 | 23.8 | 17.2 | 18.7 | 13.8 | 20.0 |
| 1970 | 14.4 | 12.7 | 26.4 | 23.1 | 16.6 | 18.3 | 28.4 | 21.0 | 19.7 | 20.6 | 21.6 | 16.5 | 19.9 |
| 1971 | 23.5 | 21.2 | 21.1 | 23.9 | 21.1 | 17.0 | 15.2 | 17.1 | 21.4 | 22.2 | 18.8 | 18.6 | 20.1 |
| 1972 | 21.9 | 18.3 | 21.5 | 18.1 | 16.6 | 21.5 | 14.0 | 34.2 | 20.4 | 20.4 | 21.8 | 18.9 | 20.6 |
| 1973 | 26.1 | 32.7 | 36.9 | 39.6 | 26.1 | 27.3 | 20.9 | 20.6 | 22.8 | 28.2 | 20.7 | 19.9 | 26.8 |
| 1974 | 25.8 | 26.4 | 33.7 | 32.9 | 29.2 | 29.2 | 32.0 | 30.2 | 33.7 | 37.3 | 26.8 | 27.5 | 30.4 |
| 1975 | 27.6 | 31.1 | 32.0 | 24.3 | 22.7 | 20.7 | 21.7 | 18.1 | 16.9 | 20.2 | 29.3 | 21.1 | 23.8 |
| 1976 | 23.3 | 28.5 | 33.4 | 25.4 | 23.7 | 17.5 | 18.4 | 17.7 | 23.7 | 20.4 | 16.9 | 18.6 | 22.3 |
| 1977 | 18.7 | 21.0 | 19.9 | 24.9 | 20.1 | 14.2 | 22.9 | 23.2 | 23.0 | 20.9 | 17.3 | 17.0 | 20.3 |
| 1978 | 24.6 | 26.2 | 25.9 | 31.3 | 31.2 | 28.3 | 19.9 | 25.6 | 27.0 | 20.8 | 24.6 | 22.0 | 25.6 |
| 1979 | 27.3 | 23.7 | 26.9 | 33.5 | 21.0 | 18.3 | 17.9 | 26.0 | 22.0 | 19.3 | 17.1 | 16.8 | 22.5 |
| 1980 | 19.0 | 17.3 | 12.7 | 18.4 | 15.6 | 20.0 | 17.0 | 15.9 | 14.2 | 21.9 | 23.3 | 21.7 | 18.1 |
| 1981 | 16.5 | 23.1 | 26.6 | 32.8 | 26.9 | 18.0 | 27.2 | 24.0 | 20.4 | 33.7 | 24.1 | 19.3 | 24.4 |
| 1982 | 24.2 | 50.6 | 28.5 | 32.9 | 26.7 | 32.1 | 43.9 | 31.4 | 45.1 | 28.5 | 33.0 | 33.8 | 34.2 |
| 1983 | 26.2 | 40.0 | 33.6 | 35.7 | 31.6 | 24.9 | 21.3 | 24.9 | 23.7 | 28.3 | 33.5 | 26.0 | 29.1 |
| 1984 | 23.5 | 26.7 | 30.7 | 32.5 | 27.2 | 23.7 | 26.4 | 25.8 | 32.6 | 33.1 | 31.0 | 29.0 | 28.5 |
| 1985 | 25.7 | 24.1 | 19.0 | 29.5 | 15.6 | 19.9 | 23.4 | 22.0 | 21.2 | 22.2 | 23.7 | 21.4 | 22.3 |
| 1986 | 22.4 | 40.0 | 21.1 | 14.3 | 18.8 | 15.9 | 16.3 | 22.3 | 24.7 | 18.6 | 21.2 | 15.3 | 20.9 |
| 1987 | 14.8 | 16.6 | 17.6 | 12.9 | 14.7 | 13.2 | 19.3 | 24.3 | 30.3 | 25.8 | 22.4 | 16.0 | 19.0 |
| 1988 | 22.4 | 23.4 | 24.8 | 25.2 | 20.5 | 20.0 | 20.2 | 20.6 | 21.4 | 23.2 | 23.3 | 25.5 | 22.5 |
| 1989 | 33.9 | 27.5 | 60.1 | 32.8 | 25.7 | 24.9 | 14.4 | 28.4 | 26.7 | 31.4 | 34.7 | 31.4 | 31.0 |
| 1990 | 27.4 | 37.8 | 33.9 | 37.4 | 25.1 | 24.6 | 21.6 | 28.2 | 25.1 | 25.1 | 17.4 | 15.2 | 26.6 |
| 1991 | 17.2 | 20.1 | 37.3 | 24.3 | 27.3 | 56.2 | 35.2 | 40.8 | 30.7 | 44.1 | 49.7 | 28.0 | 34.2 |
| 1992 | 25.9 | 47.7 | 24.5 | 19.8 | 29.1 | 24.8 | 17.9 | 24.1 | 35.8 | 27.0 | 25.0 | 26.1 | 27.3 |
| 1993 | 31.2 | 27.1 | 37.9 | 29.2 | 22.1 | 21.8 | 18.2 | 19.2 | 23.8 | 24.6 | 25.5 | 24.8 | 25.5 |
| 1994 | 26.5 | 43.2 | 37.9 | 40.2 | 40.2 | 27.2 | 20.6 | 16.0 | 20.2 | 33.3 | 23.6 | 24.1 | 29.4 |
| 1995 | 23.6 | 24.5 | 23.8 | 24.2 | 30.9 | 19.1 | 14.9 | 17.0 | 22.2 | 27.9 | 17.2 | 18.2 | 22.0 |
| 1996 | 18.8 | 20.8 | 22.3 | 20.5 | 14.0 | 11.1 | 14.7 | 18.8 | 26.2 | 23.5 | 16.3 | 15.9 | 18.6 |
| 1997 | 17.4 | 21.0 | 16.3 | 18.4 | 15.1 | 13.7 | 12.1 | 13.7 | 18.4 | 18.7 | 18.0 | 10.8 | 16.1 |
| 1998 | 16.8 | 16.4 | 21.2 | 18.0 | 28.1 | 18.8 | 19.3 | 27.0 | 21.1 | 22.4 | 26.5 | 15.9 | 21.0 |
| 1999 | 20.8 | 21.3 | 23.5 | 21.3 | | | | | | | | | 21.7 |

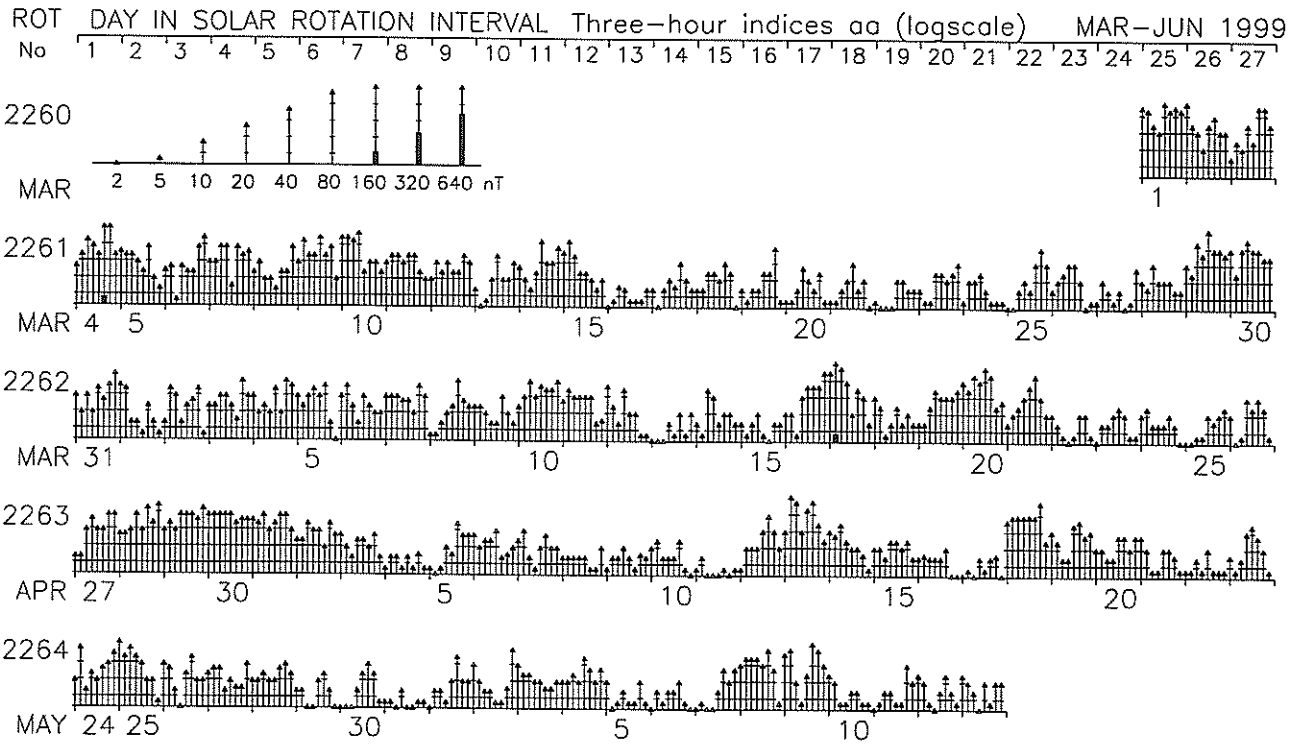
# PLANETARY GEOMAGNETIC ACTIVITY

## 3-HOUR-RANGE INDICES Km AND aa BY 27-DAY SOLAR ROTATION INTERVAL

ISGI PUBLICATION OFFICE - EMail : ISGI.PUBOFF@cetp.ipsl.fr
CETP, 4 Avenue de Neptune, F-94107 Saint Maur des Fosses CEDEX - FRANCE




Indices Derivation at Universite Paris Sud; Graph Prepared at ISGI Publication Office.




Indices Derivation at Universite Paris Sud; Graph Prepared at ISGI Publication Office.

WDC-C2 FOR GEOMAGNETISM, KYOTO UNIVERSITY

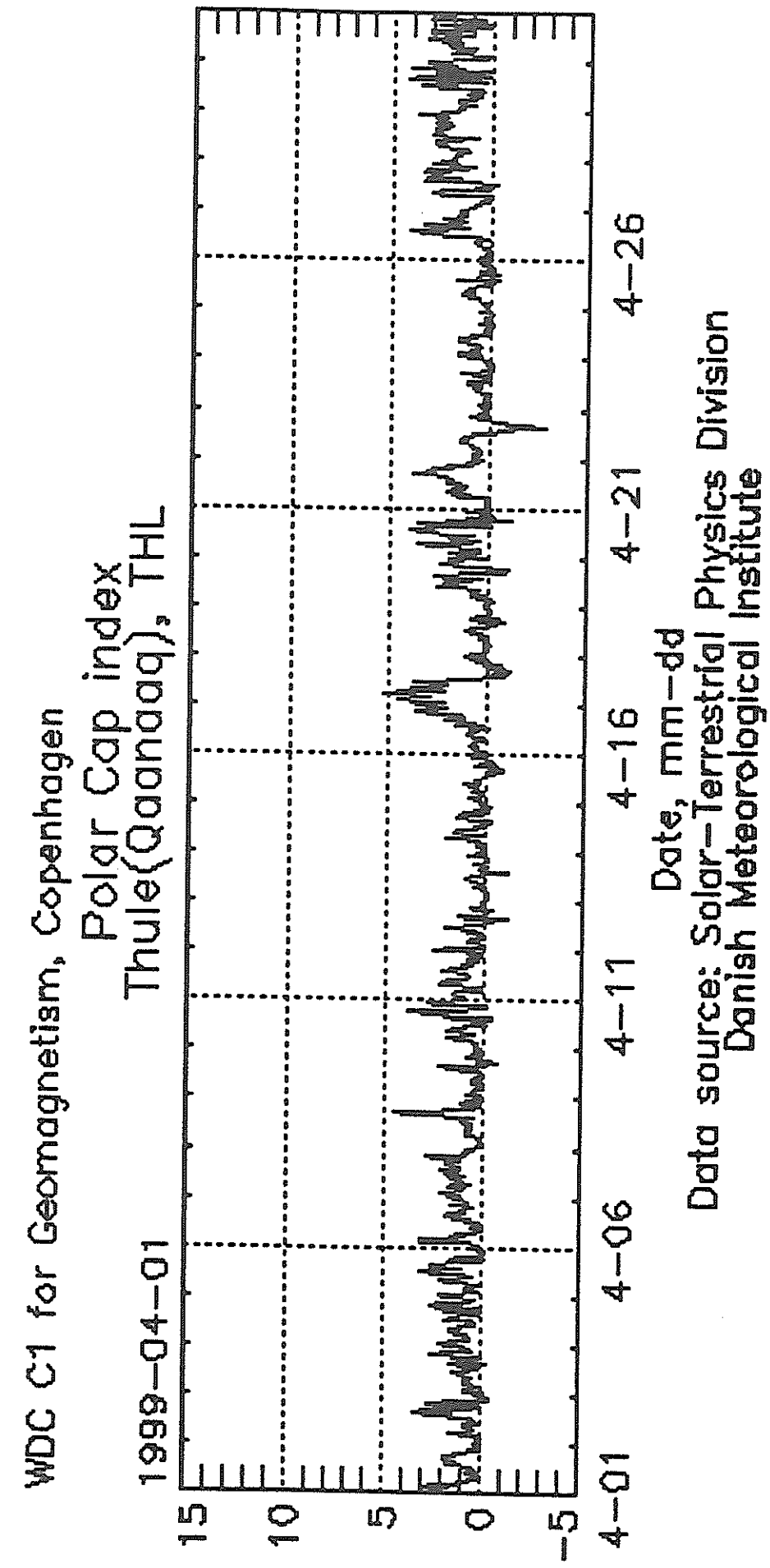
# HOURLY EQUATORIAL DST VALUES(PROVISIONAL)

## APRIL 1999

UNIT=NT

| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | U.T. 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -29 | -30 | -37 | -31 | -31 | -34 | -30 | -30 | -27 | -24 | -19 | -18 | -17 | -15 | -14 | -14 | -15 | -15 | -19 | -19 | -20 | -17 | -12 | -10 |
| 2 | -12 | -12 | -10 | -7 | -10 | -17 | -13 | -8 | -8 | -8 | -8 | -8 | -10 | -9 | -7 | -6 | -8 | -10 | -11 | -14 | -16 | -14 | -10 | -11 |
| 3 | -10 | -11 | -13 | -11 | -10 | -11 | -13 | -17 | -18 | -23 | -20 | -18 | -16 | -11 | -9 | -5 | -6 | -6 | -7 | -6 | -7 | -8 | -5 | -4 |
| 4 | -2 | -2 | -2 | -3 | -6 | -10 | -14 | -11 | -9 | -12 | -9 | -4 | -1 | -7 | -7 | -2 | -1 | -5 | -11 | -11 | -11 | -17 | -14 | -9 |
| 5 | -8 | -8 | -9 | -7 | -9 | -9 | -6 | -10 | -10 | -10 | -4 | -15 | -21 | -26 | -18 | -15 | -17 | -15 | -13 | -12 | -11 | -9 | -8 | -9 |
| 6 | -7 | -8 | -12 | -14 | -18 | -19 | -18 | -16 | -13 | -11 | -12 | -14 | -13 | -11 | -7 | -8 | -15 | -18 | -15 | -11 | -10 | -12 | -15 | -19 |
| 7 | -24 | -26 | -21 | -19 | -17 | -13 | -17 | -21 | -25 | -29 | -28 | -26 | -24 | -21 | -19 | -20 | -25 | -29 | -30 | -22 | -20 | -24 | -20 | -18 |
| 8 | -13 | -13 | -13 | -11 | -8 | -7 | -3 | -3 | -3 | -1 | 5 | 7 | 2 | -2 | -3 | -9 | -13 | -11 | -14 | -7 | -5 | -6 | -10 | -12 |
| 9 | -9 | -7 | -6 | -7 | -1 | -1 | -3 | -1 | -2 | -2 | -3 | -2 | 1 | 3 | 2 | 2 | -2 | -4 | 3 | 7 | 5 | 5 | 6 | 7 |
| 10 | 9 | 10 | 6 | 6 | 8 | 17 | 14 | 8 | -4 | -3 | -3 | -1 | 4 | 4 | 1 | -7 | -4 | -15 | -16 | -16 | -13 | -11 | -17 | -22 |
| 11 | -17 | -18 | -20 | -20 | -18 | -13 | -10 | -17 | -17 | -13 | -7 | -3 | -4 | -11 | -17 | -18 | -16 | -17 | -16 | -15 | -15 | -12 | -8 | -7 |
| 12 | -9 | -12 | -9 | -6 | -5 | -8 | -9 | -6 | -2 | -3 | -1 | -4 | -7 | -4 | 0 | 1 | 1 | -4 | -2 | 0 | 1 | -1 | -3 | -4 |
| 13 | -3 | -5 | -5 | -3 | -2 | -2 | -1 | -1 | -3 | -3 | 0 | 0 | 0 | 3 | 3 | 1 | -3 | -2 | -1 | -1 | 0 | 2 | 2 | -3 |
| 14 | -3 | -2 | -1 | 2 | 4 | 6 | 2 | -8 | -6 | -2 | -1 | 0 | 1 | 3 | 5 | 4 | 1 | 0 | -1 | 0 | -2 | -6 | -5 | -4 |
| 15 | -2 | -3 | -3 | -3 | -1 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 6 | 6 | 5 | 5 | 5 | 5 | 3 | 5 | 4 | 4 | 4 | 3 |
| 16 | 0 | 5 | 6 | 7 | 4 | 5 | 6 | 6 | 6 | 6 | 7 | 15 | 22 | 37 | 54 | 64 | 47 | 32 | 24 | 16 | 4 | 3 | 0 | -25 |
| 17 | -39 | -48 | -64 | -87 | -105 | -83 | -88 | -95 | -81 | -73 | -68 | -45 | -34 | -35 | -35 | -37 | -33 | -31 | -42 | -43 | -38 | -32 | -29 | -32 |
| 18 | -29 | -25 | -24 | -25 | -21 | -24 | -32 | -29 | -24 | -26 | -24 | -23 | -27 | -23 | -16 | -15 | -17 | -18 | -19 | -22 | -22 | -19 | -16 | -17 |
| 19 | -18 | -16 | -15 | -18 | -20 | -20 | -20 | -17 | -13 | -26 | -33 | -30 | -27 | -22 | -18 | -25 | -29 | -25 | -23 | -22 | -28 | -39 | -37 | -28 |
| 20 | -20 | -22 | -23 | -18 | -16 | -22 | -28 | -21 | -13 | -24 | -19 | -16 | -18 | -43 | -48 | -43 | -26 | -32 | -25 | -21 | -23 | -25 | -22 | -18 |
| 21 | -15 | -14 | -13 | -9 | -6 | -10 | -11 | -3 | 2 | -8 | -13 | -14 | -15 | -23 | -27 | -31 | -25 | -31 | -25 | -25 | -19 | -19 | -21 | -20 |
| 22 | -16 | -13 | -13 | -15 | -12 | -12 | -11 | -6 | -6 | -6 | -3 | -1 | -2 | -3 | -2 | 1 | 4 | 8 | 6 | 2 | -1 | 0 | 0 | 0 |
| 23 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | -1 | -4 | -4 | -3 | -1 | 1 | 2 | 0 | 0 | 2 | 2 | 4 | 5 | 5 |
| 24 | 4 | 1 | 3 | 3 | 1 | 0 | 0 | 0 | -2 | -1 | 1 | 2 | 3 | 4 | 0 | 0 | -1 | -1 | -2 | -2 | -6 | -4 | -3 | -2 |
| 25 | -2 | -1 | 1 | 4 | 4 | 4 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 3 | 3 | 0 | -1 | -1 | 4 | 4 | 3 | 4 | 7 | 12 |
| 26 | 9 | 8 | 7 | 8 | 10 | 14 | 15 | 19 | 18 | 19 | 14 | 4 | 4 | 7 | 1 | 0 | 1 | -5 | -15 | -18 | -22 | -20 | -18 | -17 |
| 27 | -16 | -15 | -13 | -11 | -12 | -12 | -9 | -3 | -7 | -21 | -21 | -11 | -10 | -10 | -7 | -9 | -15 | -16 | -14 | -21 | -13 | -12 | -17 | -20 |
| 28 | -21 | -21 | -19 | -18 | -22 | -24 | -24 | -32 | -37 | -37 | -29 | -24 | -20 | -23 | -23 | -23 | -25 | -25 | -23 | -29 | -38 | -44 | -37 | -31 |
| 29 | -33 | -29 | -27 | -23 | -27 | -32 | -26 | -17 | -14 | -11 | -13 | -17 | -17 | -23 | -15 | -15 | -23 | -15 | -21 | -24 | -28 | -22 | -30 | -31 |
| 30 | -31 | -30 | -27 | -21 | -34 | -31 | -22 | -21 | -27 | -27 | -21 | -19 | -22 | -22 | -20 | -15 | -18 | -18 | -15 | -16 | -18 | -14 | -14 | -21 |


Note: The baselines for the observatories were adjusted for secular change for the Provisional Dst values for April 1999.


WDC C1 for Geomagnetism, Copenhagen
Polar Cap index
Thule(Qaanaaq), THL
1999-04-01
15
10
5
0
-5
4-01
4-06
4-11
4-16
4-21
4-26
Date, mm-dd
Data source: Solar-Terrestrial Physics Division
Danish Meteorological Institute

# P R I N C I P A L  M A G N E T I C  S T O R M S

## APRIL 1999

| Sta | Geomag Lat | Commencement Day | Time (UT) | Type | SC Amplitudes D (Min) | H (Gamma) | Z (Gamma) | Maximum 3-Hour K Index Day(3-Hour Periods) | K | Ranges D (Min) | H (Gamma) | Z (Gamma) | End Day | Hour (UT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UJJ | 13.6N | 03 | 1800 | .. | .. | .. | .. | | - | 4 | 69 | 31 | 05 | 20 |
| NGP | 11.3N | 03 | 1800 | .. | .. | .. | .. | | - | 3 | 89 | 31 | 05 | 20 |
| ABG | 09.4N | 03 | 1800 | .. | .. | .. | .. | 03(7) 04(5) 05(4,6) | 4 | 3 | 91 | 39 | 05 | 20 |
| PND | 02.0N | 03 | 1800 | .. | .. | .. | .. | | - | 3 | 118 | 61 | 05 | 20 |
| TRD | 01.1S | 03 | 1800 | .. | .. | .. | .. | | - | -- | -- | -- | 05 | 20 |
| ETT | 00.7S | 10 | 0000 | .. | .. | .. | .. | | - | -- | 208 | 61 | 11 | 17 |
| BJI | 28.8N | 16 | 1124 | SC | 1 | 22 | 1 | 17(1) | 6 | 12 | 221 | 35 | 17 | 22 |
| KRC | 16.4N | 16 | 1124 | SC | - 1 | 21 | 11 | 16(5,6,8) 17(1,2,4) | 5 | 11 | 182 | 43 | 18 | 05 |
| UJJ | 13.6N | 16 | 1124 | SC | - 0.2 | 17 | - 3 | | - | 7 | 146 | 17 | 17 | 20 |
| NGP | 11.3N | 16 | 1124 | SC | -- | 16 | - 3 | | - | 6 | 145 | 19 | 17 | 20 |
| ABG | 09.4N | 16 | 1124 | SC | - 0.3 | 14 | - 4 | 16(5,7) 17(1) | 5 | 7 | 143 | 27 | 17 | 20 |
| HYB | 07.6N | 16 | 1126 | SC | - 0.3 | 15 | - 2 | 16(5) 17(1) | 5 | 6 | 148 | 18 | 17 | 19 |
| PND | 02.0N | 16 | 1124 | SC | - 0.1 | 15 | 15 | | - | 5 | 145 | 73 | 17 | 20 |
| ETT | 00.7S | 16 | 1126 | SC | - 0.2 | 22 | 15 | | - | -- | 163 | 78 | 18 | 19 |
| TRD | 01.1S | 16 | 1124 | SC | 0.2 | 21 | - 25 | | - | 3 | 154 | 119 | 17 | 20 |
| HER | 33.6S | 16 | 1126 | SC | 1 | 15 | 11 | 17(2) | 6 | 34 | 119 | 102 | 17 | 19 |
| UJJ | 13.6N | 19 | 1000 | .. | .. | .. | .. | | - | 5 | 119 | 32 | 21 | 23 |
| NGP | 11.3N | 19 | 1000 | .. | .. | .. | .. | | - | 5 | 139 | 39 | 21 | 23 |
| ABG | 09.4N | 19 | 1000 | .. | .. | .. | .. | 20(5) 21(6) 29(6) | 5 | 5 | 138 | 42 | 21 | 23 |
| HYB | 07.6N | 19 | 0700 | .. | .. | .. | .. | 20(5) 21(6) | 5 | 5 | 148 | 30 | 21 | 22 |
| PND | 02.0N | 19 | 1000 | .. | .. | .. | .. | | - | 4 | 165 | 53 | 21 | 23 |
| ETT | 00.7S | 19 | 0100 | .. | .. | .. | .. | | - | -- | 228 | 59 | 21 | 23 |
| TRD | 01.1S | 19 | 1000 | .. | .. | .. | .. | | - | 3 | 206 | 111 | 21 | 23 |
| KRC | 16.4N | 20 | 0226 | .. | .. | .. | .. | 20(3,5,6) | 5 | 5 | 91 | 54 | 21 | 08 |
| KRC | 16.4N | 27 | 0301 | .. | .. | .. | .. | 27(2,7) 28(2,3,4,8) | 5 | 9 | 85 | 55 | 29 | 07 |
| HYB | 07.6N | 27 | 0700 | .. | .. | .. | .. | 29(6) | 5 | 7 | 90 | 36 | 30 | 19 |
| ETT | 00.7S | 27 | 0600 | .. | .. | .. | .. | | - | -- | 141 | 68 | 30 | 19 |
| HER | 33.6S | 28 | 21-- | .. | .. | .. | .. | 28(8) | 6 | 30 | 76 | 85 | 30 | 02 |

Stations:

ABG = ALIBAG
AMS = MARTIN DE VIVIES
ANN = ANNAMALAINAGAR
BJI = BEIJING
CAN = CANBERRA
CMO = COLLEGE
CZT = PORT ALFRED
DRV = DUMONT D'URVILLE
ETT = ETAIYAPURAM
GNA = GNANGARA
GUA = GUAM
HER = HERMANUS
HON = HONOLULU
HYB = HYDERABAD
JAI = JAIPUR
KRC = KARACHI
NGP = NAGPUR
PAF = PORT AUX FRANCAIS
PMG = PORT MORESBY
PND = PONDICHERRY
SHL = SHILLONG
SIT = SITKA
TRD = TRIVANDRUM
UJJ = UJJAIN

# MAGNETIC STORM SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS (PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS)

## APRIL 1999

| Storm Sudden Commencements (SSC) | | | Solar Flare Effects (sfe) | | |
|---|---|---|---|---|---|
| Day | Time | Quality: Station Group* | Day | Begin-End | Station(s) |
| 16 | 1125 | A: SOD* NUR* WNG* DOU* HRB NAG* COI* BJI SPT* | 01 | 0651-0658 | BDV |
| | | | 02 | 0810-0400 | BDV+ |
| | | B: NGK* BDV* GCK* MMB* EBR* KAK KNY QUE HYB ETT HER | 04 | 0519-0540 | MMB+ KAK+ KNY+ HYB ETT GNA+ CNB+ |
| | | C: GNA CNB* | | | |

REPORTING OBSERVATORIES (up to the 4th of June 1999):
SOD NUR WNG NGK DOU BDV HRB NAG GCK MMB EBR COI BJI SPT KAK KNY QUE HYB ETT GNA HER CNB

Three-letter codes identify each observatory. Reporting stations have been grouped by the character of the observed event. The letter A means very remarkable; B means fair, but unmistakable; C means very poor, doubtful; and - means no quality figure given. The * means that the SSC, at least in one component, was preceded by a small reversed impulse. SSCs are given only when five or more stations report the event. SFEs include all reports. If an SFE is confirmed by solar or ionospheric events, the name of the station is identified with a plus sign (+ ).

☆U.S. GOVERNMENT PRINTING OFFICE:1999-733-002/29027

# WORLD DATA CENTER A
## FOR
## SOLAR-TERRESTRIAL PHYSICS

The ICSU Panel on WDCs has recommended that it would be appropriate courtesy to acknowledge in publications that data were obtained from the originating station or investigator through the intermediary of the WDCs. The following statement is suggested:

"Data used in this study were provided by WDC-A for Solar-Terrestrial Physics, NOAA E/GC2, 325 Broadway, Boulder Colorado 80303, USA."