**Space Weather Highlights** **SWPC PRF 2416**
**13 December - 19 December 2021** **20 December 2021**

Solar activity ranged from very low to moderate levels throughout the week. Very low activity levels (B-class flares) were observed on 13 Dec, with low levels (C-class flares) observed on 14-16, 18-19 Dec. Moderate solar activity was observed on 17 Dec due to an M1/1f flare at 17/0051 UTC from Region 2911 (N19, L=273, class/area=Cao/80 on 17 Dec), which was the largest event of the period. In addition to the single M-class flare, Region 2911 along with Regions 2907 (S19, L=315, class/area=Dki/310 on 18 Dec) and 2909 (S21, L=285, class/area=Dso/210 on 17 Dec) were prolific C-class flare producers throughout the week. A number of CMEs were observed off the SE quadrant throughout the week, but no obvious transient solar wind signatures were observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels on 13 Dec, with normal to moderate levels observed over 14-19 Dec.

Geomagnetic field activity reached G1 (Minor) geomagnetic storm levels on 19 Dec due to what was thought to be CIR effects preceding negative polarity CH HSS influence. Quiet to unsettled conditions were observed on 13 and 15-16 Dec and quiet conditions were observed throughout the remainder of the week.

**Space Weather Outlook**
**20 December - 15 January 2022**

Solar activity is expected to very low to low throughout the outlook period, with a slight chance for isolated R1-R2 (Minor-Moderate) radio blackout conditions.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 22-24 Dec and 29 Dec-01 Jan. Normal to moderate flux levels are expected to prevail throughout the remainder of the outlook period.

Geomagnetic field activity is expected to reach G1 (Minor) geomagnetic storm levels early on 20 Dec due to what is thought to be the effects of a CIR preceding negative polarity CH HSS influence. Active conditions are expected on 21-22, and 28 Dec due to the anticipated influences of multiple recurrent CH HSSs. Quiet or quiet to unsettled conditions are expected to prevail throughout the remainder of the forecast period.

## *Daily Solar Data*

| Date | Radio Flux 10.7cm | Sun spot No. | Sunspot Area ($10^{-6}$ hemi.) | X-ray Background Flux | Flares | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | X-ray | | | Optical | | | | |
| | | | | | C | M | X | S | 1 | 2 | 3 | 4 |
| 13 December | 81 | 40 | 40 | A4.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 December | 89 | 40 | 110 | B2.1 | 4 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| 15 December | 103 | 79 | 830 | B5.0 | 8 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| 16 December | 118 | 127 | 650 | B4.9 | 8 | 0 | 0 | 4 | 0 | 1 | 0 | 0 |
| 17 December | 121 | 119 | 920 | B5.3 | 9 | 1 | 0 | 8 | 1 | 0 | 0 | 0 |
| 18 December | 121 | 117 | 900 | B4.7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 December | 115 | 109 | 740 | B4.0 | 4 | 0 | 0 | 2 | 1 | 0 | 0 | 0 |

## *Daily Particle Data*

| Date | Proton Fluence (protons/cm $^2$ -day -sr) | | Electron Fluence (electrons/cm$^2$ -day -sr) |
|---|---|---|---|
| | >1 MeV | >10 MeV | >2MeV |
| 13 December | 1.5e+06 | 4.5e+04 | 2.9e+06 |
| 14 December | 5.9e+05 | 4.4e+04 | 1.5e+06 |
| 15 December | 1.9e+06 | 4.4e+04 | 2.0e+06 |
| 16 December | 3.4e+05 | 4.4e+04 | 2.0e+06 |
| 17 December | 7.8e+04 | 4.5e+04 | 1.8e+06 |
| 18 December | 1.9e+05 | 4.5e+04 | 2.8e+06 |
| 19 December | 3.0e+06 | 4.5e+04 | 5.1e+06 |

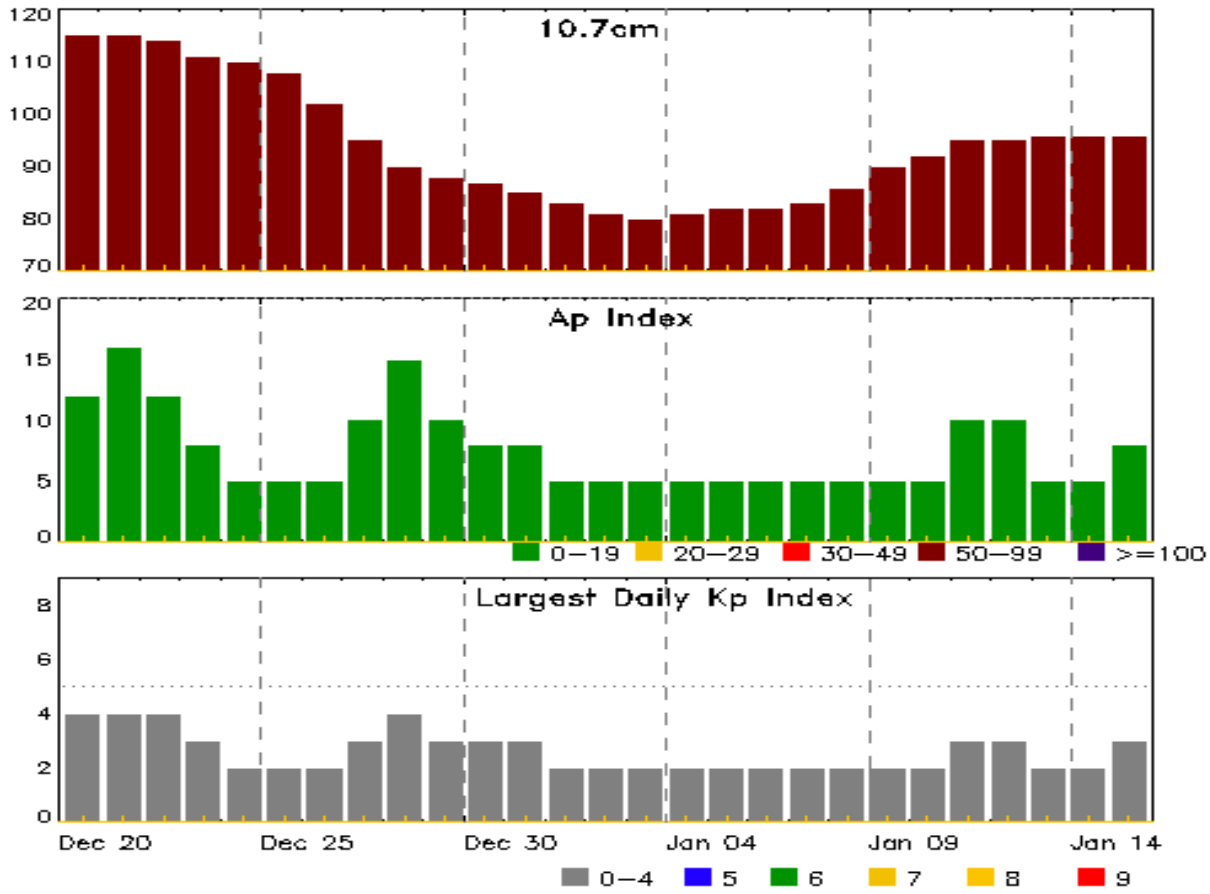
## *Daily Geomagnetic Data*

| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|---|---|---|---|---|---|---|
| | A | K-indices | A | K-indices | A | K-indices |
| 13 December | 6 | 1-2-3-2-1-1-1-1 | 4 | 0-1-3-2-1-0-0-0 | 6 | 0-3-3-2-1-0-1-1 |
| 14 December | 4 | 1-1-2-1-2-1-1-1 | 5 | 0-0-3-2-3-0-0-0 | 5 | 1-1-2-1-1-1-1-1 |
| 15 December | 8 | 1-2-2-3-2-2-2-2 | 14 | 0-1-4-4-4-3-2-1 | 9 | 1-2-2-3-2-3-2-2 |
| 16 December | 5 | 1-2-2-2-1-1-1-1 | 9 | 1-2-3-4-2-1-1-1 | 8 | 2-3-3-2-1-1-2-2 |
| 17 December | 2 | 1-1-0-0-1-1-1-0 | 1 | 0-0-1-1-0-0-0-0 | 3 | 2-1-1-0-1-1-0-0 |
| 18 December | 2 | 0-1-0-0-1-1-1-1 | 3 | 0-0-1-3-1-1-0-1 | 4 | 1-1-0-1-1-1-2-1 |
| 19 December | 8 | 0-0-0-0-2-3-3-4 | 10 | 0-0-0-1-2-3-4-4 | 2 | 0-0-0-0-2-4-4-5 |

## *Alerts and Warnings Issued*

| Date & Time of Issue UTC | Type of Alert or Warning | Date & Time of Event UTC |
|---|---|---|
| 16 Dec 0442 | ALERT: Type II Radio Emission | 16/0352 |
| 16 Dec 0443 | ALERT: Type IV Radio Emission | 16/0355 |
| 19 Dec 1749 | WARNING: Geomagnetic K = 4 | 19/1748 - 20/0600 |
| 19 Dec 1801 | ALERT: Geomagnetic K = 4 | 19/1759 |
| 19 Dec 2223 | WARNING: Geomagnetic K = 5 | 19/2222 - 20/0600 |
| 19 Dec 2230 | ALERT: Geomagnetic K = 5 | 19/2229 |

## *Twenty-seven Day Outlook*




| Date | Radio Flux 10.7cm | Planetary A Index | Largest Kp Index | Date | Radio Flux 10.7cm | Planetary A Index | Largest Kp Index |
|---|---|---|---|---|---|---|---|
| 20 Dec | 115 | 12 | 4 | 03 Jan | 80 | 5 | 2 |
| 21 | 115 | 16 | 4 | 04 | 81 | 5 | 2 |
| 22 | 114 | 12 | 4 | 05 | 82 | 5 | 2 |
| 23 | 111 | 8 | 3 | 06 | 82 | 5 | 2 |
| 24 | 110 | 5 | 2 | 07 | 83 | 5 | 2 |
| 25 | 108 | 5 | 2 | 08 | 86 | 5 | 2 |
| 26 | 102 | 5 | 2 | 09 | 90 | 5 | 2 |
| 27 | 95 | 10 | 3 | 10 | 92 | 5 | 2 |
| 28 | 90 | 15 | 4 | 11 | 95 | 10 | 3 |
| 29 | 88 | 10 | 3 | 12 | 95 | 10 | 3 |
| 30 | 87 | 8 | 3 | 13 | 96 | 5 | 2 |
| 31 | 85 | 8 | 3 | 14 | 96 | 5 | 2 |
| 01 Jan | 83 | 5 | 2 | 15 | 96 | 8 | 3 |
| 02 | 81 | 5 | 2 | | | | |

## *Energetic Events*

| | Time | | | X-ray | | Optical Information | | | Peak Radio Flux | | Sweep Freq Intensity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Begin | Max | Half Max | Class | Integ Flux | Imp/ Brtns | Location Lat CMD | Rgn # | 245 | 2695 | II | IV |
| 17 Dec | 0039 | 0051 | 0056 | M1.2 | | 0.005 | 1F | N20E70 | 2911 | | | |

## *Flare List*

| | Time | | | | Optical | | |
|---|---|---|---|---|---|---|---|
| Date | Begin | Max | End | X-ray Class | Imp/ Brtns | Location Lat CMD | Rgn # |
| 13 Dec | 0617 | 0625 | 0632 | B1.4 | | | |
| 13 Dec | 1624 | 1637 | 1644 | B2.8 | | | 2907 |
| 13 Dec | 1731 | 1738 | 1745 | B1.8 | | | 2907 |
| 13 Dec | 1912 | 1923 | 1930 | B3.0 | | | 2907 |
| 13 Dec | 2058 | 2110 | 2111 | B3.6 | | | 2907 |
| 13 Dec | 2333 | 2342 | 2350 | B2.0 | | | |
| 14 Dec | 0151 | 0203 | 0217 | B2.3 | | | |
| 14 Dec | 0540 | 0548 | 0552 | B2.5 | | | 2906 |
| 14 Dec | 0635 | 0642 | 0651 | B4.8 | SF | S36E37 | 2906 |
| 14 Dec | 0748 | 0755 | 0759 | B3.5 | SF | S36E37 | 2906 |
| 14 Dec | 0816 | 0826 | 0836 | C1.4 | | | 2907 |
| 14 Dec | 0923 | 0924 | 0926 | | SF | S29E31 | 2906 |
| 14 Dec | 1008 | 1018 | 1022 | B4.1 | | | 2906 |
| 14 Dec | 1037 | 1043 | 1047 | B3.9 | | | 2906 |
| 14 Dec | 1100 | 1109 | 1115 | B2.3 | | | 2906 |
| 14 Dec | 1129 | 1138 | 1146 | B4.1 | SF | S30E30 | 2906 |
| 14 Dec | 1216 | 1218 | 1223 | B3.4 | | | 2906 |
| 14 Dec | 1253 | 1300 | 1309 | B3.1 | | | 2906 |
| 14 Dec | 1349 | 1406 | 1420 | B6.3 | | | 2907 |
| 14 Dec | 1452 | 1500 | 1511 | B4.6 | | | 2907 |
| 14 Dec | 1523 | 1530 | 1539 | B7.8 | | | 2906 |
| 14 Dec | 1539 | 1545 | 1551 | B7.5 | | | 2907 |
| 14 Dec | 1551 | 1603 | 1620 | C1.1 | | | 2907 |
| 14 Dec | 1635 | 1649 | 1656 | C1.3 | | | 2907 |
| 14 Dec | 1819 | 1830 | 1839 | B5.8 | | | 2906 |
| 14 Dec | 2023 | 2033 | 2043 | C3.0 | | | 2907 |
| 14 Dec | 2155 | 2206 | 2212 | C1.6 | | | 2906 |
| 14 Dec | 2312 | 2325 | 2344 | C6.0 | SF | S21E45 | 2907 |
| 15 Dec | 0121 | 0122 | 0123 | | SF | S22E73 | 2907 |
| 15 Dec | 0136 | 0146 | 0155 | C2.1 | | | 2907 |

## *Flare List*

| Date | Time | | | Optical | | | |
|---|---|---|---|---|---|---|---|
| | Begin | Max | End | X-ray Class | Imp/ Brtns | Location Lat CMD | Rgn # |
| 15 Dec | 0257 | 0304 | 0309 | C2.8 | | | 2907 |
| 15 Dec | 0338 | 0346 | 0351 | C1.9 | | | 2907 |
| 15 Dec | 0407 | 0421 | 0432 | C4.5 | SF | S21E45 | 2907 |
| 15 Dec | 0448 | 0454 | 0458 | C2.8 | | | 2907 |
| 15 Dec | 0548 | 0558 | 0608 | C1.6 | | | 2907 |
| 15 Dec | 0838 | 0852 | 0905 | C1.5 | | | 2907 |
| 15 Dec | 1004 | 1010 | 1013 | C8.1 | SF | S21E44 | 2907 |
| 15 Dec | 1050 | 1051 | 1111 | | SF | S21E46 | 2907 |
| 15 Dec | 1208 | 1217 | 1226 | C2.6 | SF | S20E45 | 2907 |
| 15 Dec | 1409 | 1413 | 1421 | C1.5 | | | 2907 |
| 15 Dec | 1427 | 1434 | 1438 | C4.4 | | | 2907 |
| 15 Dec | 1716 | 1723 | 1732 | B7.4 | | | 2907 |
| 16 Dec | 0313 | 0319 | 0324 | B7.6 | | | 2909 |
| 16 Dec | 0326 | 0334 | 0341 | C1.4 | | | 2909 |
| 16 Dec | 0344 | 0354 | 0404 | C1.3 | | | 2909 |
| 16 Dec | 0506 | 0521 | 0536 | C1.5 | | | 2907 |
| 16 Dec | 0745 | 0748 | 0752 | B9.3 | | | |
| 16 Dec | 0919 | 0928 | 0937 | B9.1 | | | |
| 16 Dec | 1247 | 1247 | 1250 | | SF | N19E76 | |
| 16 Dec | 1330 | U1334 | A1358 | C2.0 | 2F | N14E63 | 2911 |
| 16 Dec | 1519 | 1527 | 1531 | C3.3 | | | 2909 |
| 16 Dec | 1636 | 1643 | 1647 | B7.8 | | | 2911 |
| 16 Dec | 1958 | 1959 | A2010 | C2.3 | SF | N19E76 | 2911 |
| 16 Dec | 2029 | 2044 | 2106 | C2.9 | | | 2911 |
| 16 Dec | 2335 | 2339 | 2343 | C3.0 | SF | S23E61 | 2909 |
| 16 Dec | 2346 | 2347 | 2353 | | SF | N20E71 | 2911 |
| 17 Dec | 0021 | 0021 | 0022 | | SF | S21E44 | 2908 |
| 17 Dec | 0039 | 0051 | 0056 | M1.2 | 1F | N20E70 | 2911 |
| 17 Dec | 0203 | 0214 | 0220 | | SF | N20E70 | 2911 |
| 17 Dec | 0325 | 0331 | 0341 | C1.5 | SF | N19E69 | 2911 |
| 17 Dec | 0401 | 0408 | 0412 | C1.2 | | | 2911 |
| 17 Dec | 0450 | 0458 | 0503 | C1.3 | SF | N19E67 | 2911 |
| 17 Dec | 0506 | 0510 | 0515 | C1.4 | | | 2911 |
| 17 Dec | 0618 | 0625 | 0630 | C1.3 | SF | N19E66 | 2911 |
| 17 Dec | 0706 | 0707 | 0712 | | SF | N19E66 | 2911 |
| 17 Dec | 0842 | 0842 | 0904 | | SF | S24E39 | 2908 |
| 17 Dec | 1255 | 1312 | 1325 | C2.3 | SF | S22E50 | 2909 |
| 17 Dec | 1408 | 1412 | 1418 | B9.8 | | | 2907 |

## *Flare List*

| | Time | | | Optical | | | |
|---|---|---|---|---|---|---|---|
| Date | Begin | Max | End | X-ray Class | Imp/ Brtns | Location Lat CMD | Rgn # |
| 17 Dec | 1422 | 1430 | 1439 | C1.0 | | | 2907 |
| 17 Dec | 1739 | 1753 | 1808 | C1.5 | | | 2911 |
| 17 Dec | 2031 | 2035 | 2045 | B8.1 | | | 2908 |
| 17 Dec | 2222 | 2230 | 2236 | C1.3 | | | |
| 18 Dec | 0102 | 0110 | 0115 | B9.2 | | | |
| 18 Dec | 0140 | 0154 | 0212 | C1.1 | | | 2909 |
| 18 Dec | 1117 | 1124 | 1130 | B9.0 | | | 2807 |
| 18 Dec | 1727 | 1801 | 1836 | C6.3 | | | 2807 |
| 19 Dec | 1034 | 1042 | 1047 | B6.3 | | | 2907 |
| 19 Dec | 1151 | 1159 | 1203 | C1.5 | SF | S25W02 | 2907 |
| 19 Dec | 1426 | 1429 | 1433 | B9.1 | | | 2907 |
| 19 Dec | 1615 | 1623 | 1627 | C1.8 | SF | S23W03 | 2907 |
| 19 Dec | 1904 | 1916 | 1928 | C1.8 | | | 2907 |
| 19 Dec | 2059 | 2112 | 2127 | C3.7 | | | 2907 |
| 19 Dec | 2108 | 2112 | 2118 | | 1F | S20W09 | 2907 |

## *Region Summary*

| | Location | | Sunspot Characteristics | | | | | Flares | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Helio | Area | Extent | Spot | Spot | Mag | X-ray | | | Optical | | | | |
| Date | Lat CMD | Lon | $10^{-6}$ hemi. | (helio) | Class | Count | Class | C | M | X | S | 1 | 2 | 3 | 4 |
| | | | ***Region 2904*** | | | | | | | | | | | | |
| 04 Dec | S26E54 | 84 | 10 | 1 | Axx | 1 | A | | | | | | | | |
| 05 Dec | S27E45 | 80 | 30 | 4 | Bxo | 3 | B | | | | | | | | |
| 06 Dec | S27E29 | 81 | 10 | 4 | Bxo | 4 | B | | | | 1 | | | | |
| 07 Dec | S26E16 | 81 | 10 | 2 | Bxo | 3 | B | | | | | | | | |
| 08 Dec | S26E03 | 83 | plage | | | | | | | | | | | | |
| 09 Dec | S26W11 | 83 | plage | | | | | | | | | | | | |
| 10 Dec | S26W25 | 84 | plage | | | | | | | | | | | | |
| 11 Dec | S26W39 | 85 | plage | | | | | | | | | | | | |
| 12 Dec | S26W53 | 86 | plage | | | | | | | | | | | | |
| 13 Dec | S26W65 | 85 | plage | | | | | | | | | | | | |
| 14 Dec | S26W79 | 86 | plage | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 83

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ***Region 2905*** | | | | | | | | | | | | |
| 12 Dec | S11E44 | 349 | 30 | 2 | Cro | 2 | B | | | | | | | | |
| 13 Dec | S11E31 | 349 | 20 | 4 | Cro | 3 | B | | | | | | | | |
| 14 Dec | S11E16 | 351 | 10 | 1 | Hrx | 1 | A | | | | | | | | |
| 15 Dec | S11E03 | 350 | 0 | 1 | Axx | 1 | A | | | | | | | | |
| 16 Dec | S12W11 | 351 | 10 | 1 | Axx | 1 | A | | | | | | | | |
| 17 Dec | S12W25 | 352 | plage | | | | | | | | | | | | |
| 18 Dec | S12W39 | 353 | plage | | | | | | | | | | | | |
| 19 Dec | S12W53 | 353 | plage | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 350

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ***Region 2906*** | | | | | | | | | | | | |
| 13 Dec | S29E38 | 343 | 10 | 2 | Bxo | 4 | B | | | | | | | | |
| 14 Dec | S29E24 | 343 | 50 | 7 | Cso | 4 | B | 1 | | | 4 | | | | |
| 15 Dec | S29E09 | 344 | 120 | 4 | Dao | 4 | B | | | | | | | | |
| 16 Dec | S29W04 | 344 | 60 | 7 | Cso | 9 | B | | | | | | | | |
| 17 Dec | S29W16 | 343 | 50 | 9 | Cso | 7 | B | | | | | | | | |
| 18 Dec | S29W30 | 344 | 20 | 7 | Cro | 4 | B | | | | | | | | |
| 19 Dec | S29W45 | 345 | 20 | 1 | Hrx | 1 | A | | | | | | | | |
| | | | | | | | | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 344

## *Region Summary - continued*

| | Location | | Sunspot Characteristics | | | | | Flares | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Helio | Area | Extent | Spot | Spot | Mag | X-ray | | | Optical | | | | |
| Date | Lat CMD | Lon | $10^{-6}$ hemi. | (helio) | Class | Count | Class | C | M | X | S | 1 | 2 | 3 | 4 |
| | | | ***Region 2907*** | | | | | | | | | | | | |
| 13 Dec | S21E60 | 320 | 10 | 4 | Bxo | 3 | B | | | | | | | | |
| 14 Dec | S21E49 | 318 | 50 | 7 | Dsc | 5 | BG | 3 | | | 1 | | | | |
| 15 Dec | S21E39 | 314 | 260 | 8 | Dki | 12 | BG | 8 | | | 5 | | | | |
| 16 Dec | S20E26 | 314 | 180 | 10 | Dai | 23 | BG | 1 | | | | | | | |
| 17 Dec | S19E12 | 315 | 280 | 10 | Dhi | 19 | BG | 1 | | | | | | | |
| 18 Dec | S19W01 | 315 | 310 | 10 | Dki | 24 | BG | | | | | | | | |
| 19 Dec | S21W14 | 314 | 250 | 10 | Dki | 15 | BG | 4 | | | 2 | 1 | | | |
| | | | | | | | | 17 | 0 | 0 | 8 | 1 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 315

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ***Region 2908*** | | | | | | | | | | | | |
| 15 Dec | S21E58 | 295 | 300 | 6 | Dko | 6 | B | | | | | | | | |
| 16 Dec | S20E43 | 297 | 210 | 8 | Dao | 10 | B | | | | | | | | |
| 17 Dec | S20E30 | 297 | 270 | 9 | Dki | 18 | BG | | | | 2 | | | | |
| 18 Dec | S19E15 | 298 | 270 | 10 | Dki | 15 | BG | | | | | | | | |
| 19 Dec | S21E02 | 298 | 240 | 12 | Eai | 13 | B | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 298

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ***Region 2909*** | | | | | | | | | | | | |
| 15 Dec | S21E70 | 283 | 150 | 9 | Dao | 6 | B | | | | | | | | |
| 16 Dec | S21E58 | 282 | 150 | 7 | Dao | 5 | B | 4 | | | 1 | | | | |
| 17 Dec | S21E42 | 285 | 210 | 7 | Dso | 6 | B | 1 | | | 1 | | | | |
| 18 Dec | S21E29 | 285 | 210 | 7 | Dao | 6 | B | 1 | | | | | | | |
| 19 Dec | S21E16 | 284 | 120 | 6 | Cao | 4 | B | | | | | | | | |
| | | | | | | | | 6 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 284

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ***Region 2910*** | | | | | | | | | | | | |
| 16 Dec | N13W16 | 356 | 20 | 5 | Cro | 6 | B | | | | | | | | |
| 17 Dec | N14W28 | 355 | 30 | 4 | Cro | 5 | B | | | | | | | | |
| 18 Dec | N12W44 | 356 | 10 | 3 | Bxo | 2 | B | | | | | | | | |
| 19 Dec | N13W53 | 353 | 20 | 2 | Hsx | 2 | A | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 356

## *Region Summary - continued*

| | Location | | Sunspot Characteristics | | | | | Flares | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Helio | Area | Extent | Spot | Spot | Mag | X-ray | | | Optical | | | | |
| Date | Lat CMD | Lon | $10^{-6}$ hemi. | (helio) | Class | Count | Class | C | M | X | S | 1 | 2 | 3 | 4 |
| | | ***Region 2911*** | | | | | | | | | | | | | |
| 16 Dec | N19E70 | 270 | 20 | 5 | Cro | 3 | B | 3 | | | 2 | | | | |
| 17 Dec | N19E54 | 273 | 80 | 5 | Cao | 4 | B | 6 | 1 | | 5 | 1 | | | |
| 18 Dec | N20E39 | 275 | 80 | 4 | Cao | 6 | B | | | | | | | | |
| 19 Dec | N20E25 | 275 | 50 | 3 | Hax | 3 | A | | | | | | | | |
| | | | | | | | | 9 | 1 | 0 | 7 | 1 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 275

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ***Region 2912*** | | | | | | | | | | | | | |
| 19 Dec | S12E64 | 236 | 40 | 1 | Hsx | 1 | A | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 236

## *Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)*

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
Space Weather Prediction Center
325 Broadway, Boulder CO 80305

**Notice:** The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

The Weekly has been published continuously since 1951 and is available online since 1997.

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https://www.ngdc.noaa.gov/stp/satellite/goes-r.html -- NCEI GOES data textarchive

https://www.swpc.noaa.gov/products/solar-cycle-progression -- Solar Cycle Progression web site

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https://www.swpc.noaa.gov/sites/default/files/images/u2/Usr_guide.pdf -- User Guide