

Solar activity levels ranged from low to high. The summary period began with activity at low levels as numerous C-class flares were observed from Region 649 (S10, L=044, class/area, Eac/370 on 19 July) and Region 652 (N08, L=345, class/area, Fkc/2010 on 21 July). By 20 July, activity levels rose to high as Region 652 produced an M8/3b flare at 1232 UTC. Associated with this flare was a 3000 sfu Tenflare, a Type II radio sweep with an estimated shock velocity of 485 km/s, and a Type IV sweep. In conjunction with this event, a C6/Sf flare occurred at 20/1126 UTC and had an associated full-halo CME on LASCO imagery. By 21 July, activity levels decayed to low, but by early on 22 July, levels rose to high. At 22/0032 UTC, Region 652 produced an M9 flare as well as several C-class flares during the period from 0633 to 0808 UTC. Two CMEs occurred simultaneously which formed a faint full halo CME signature on LASCO imagery. Moderate levels returned on the 23rd with three M-class flares observed from Region 652, the largest event was an M2/Sf at 23/1728 UTC. A CME with a plane-of-sky speed of 700 km/s was observed with this flare. Earlier in the day, at 23/1609 UTC, Region 652 produced a C1 flare with an associated Type II (710 km/s) radio sweep. LASCO imagery observed another full-halo CME from this flare. Moderate levels remained on 24 July with three M-class flares observed from Region 652. Three CMEs were observed on LASCO imagery, although none were Earth directed. Solar activity levels reached high on 25 July as four M-class flares were observed from Region 652, the largest was an M7/2b that occurred at 25/0551 UTC. Associated with this flare were moderate centimetric bursts including an 819 sfu Tenflare, and a Type IV radio sweep. A weak, non-Earth directed CME accompanied this event. At 25/1514 UTC, a long duration M1/1f flare erupted in Region 652 with Type II (898 km/s) and Type IV radio sweeps. LASCO imagery indicated that an Earth directed, full-halo CME accompanied this event. By the end of the summary period, Region 652 had shown some decay; however, it remained a large and complex beta-gamma-delta sunspot group.

Solar wind data were available from the NASA Advanced Composition Explorer (ACE) spacecraft during most of the summary period. The period began with solar wind speed near 400 km/s but by early on 20 July, velocity increased to near 600 km/s. Wind speed fluctuated between 500 and 600 km/s throughout the 20th, but had decayed to 425 km/s by the end of the 21st. Through midday on 22 July, the IMF Bz fluctuated between +5 to -5 nT. At 22/1028 UTC, a geomagnetic sudden impulse was observed, followed by a steady increase in solar wind speed to near 700 km/s and a southward turning of the Bz to -19 nT. This transient was believed to have been the result of CME activity seen on 20 July. Speed decreased to near 500 km/s by midday on 23 July and remained so until a weak sudden impulse was observed at ACE on 24/0600 UTC. Wind speed increased to 600 km/s and remained so throughout the 24th. The IMF Bz responded with a southward turning to -20 nT during this period. This transient was likely associated with the complex series of CMEs observed on 22 July. Late in the summary period, a discontinuity in the solar wind suggested that transient flow from CME activity on 23 July arrived. Wind speed responded with an increase in velocity to near 700 km/s while the IMF Bz ranged from +5 to -12nT.

As the period ended, a greater than 10 MeV proton event was in progress associated with the long duration M1 flare on 25 July. The event began at 25/1855 UTC and reached a peak of 55 pfu at 25/2305 UTC. The proton event was still in progress at this writing.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 23 – 25 July.

The geomagnetic field ranged from quiet to severe storm levels. The first three days of the summary period were dominated by quiet to unsettled geomagnetic conditions. Late on 22 July, minor to major storm conditions were observed and persisted throughout most of 23 July. This activity was most likely the result of CME activity from 20 July. By the end of 23 July, activity levels had decreased to mostly quiet to unsettled. Early on 24 July, activity levels increased to active to minor storming and by 25 July, activity levels further increased to major to severe storming as transient effects from the series of CMEs from 22 and 23 July made their presence felt.



## **Space Weather Outlook**

### **28 July - 23 August 2004**

Solar activity is expected to range from mostly low to moderate with isolated high activity possible through 29 July when Region 652 is due to rotate around the west limb. From 30 July through to 07 August, activity levels are expected to be mostly very low to low. Old Regions 649 and 652 are due to return on 07 and 12 August respectively and produce occasional moderate activity levels.

A greater than 10 MeV proton event is possible early in the period.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to reach high levels on 28 – 30 July.

Early in the forecast period, from 28 to 29 July, the geomagnetic field is expected to range from mostly unsettled to active levels with isolated minor storm periods due to geoeffective CMEs associated with flare activity in Region 652. During the same period, a weak, recurrent coronal hole stream is expected to also be in a geoeffective position. Thereafter, through the end of the forecast period, mostly quiet to unsettled conditions are expected.



### *Daily Solar Data*

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
19 July	170	176	2325	B8.2	11	0	0	9	2	0	0	0
20 July	175	147	2190	B8.2	8	1	0	3	1	0	1	0
21 July	172	162	2420	B6.5	3	0	0	1	2	0	0	0
22 July	173	117	2070	B9.1	8	3	0	4	0	1	0	0
23 July	165	86	2050	B6.2	5	2	0	3	0	0	0	0
24 July	147	109	1730	B5.0	12	2	0	4	1	0	0	0
25 July	145	130	1440	B7.2	3	4	0	3	2	1	0	0

### *Daily Particle Data*

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1MeV	>10MeV	>100MeV	>.6MeV	>2MeV	>4MeV
	19 July	1.2E+5	1.3E+4	2.7E+3		5.5E+6
20 July	1.3E+5	1.2E+4	2.5E+3		1.6E+7	
21 July	2.0E+5	1.3E+4	2.7E+3		2.9E+7	
22 July	9.8E+5	2.9E+4	2.7E+3		1.6E+7	
23 July	2.1E+7	1.5E+5	3.7E+3		4.0E+8	
24 July	1.8E+7	1.2E+5	2.6E+3		3.3E+8	
25 July	1.9E+7	5.9E+5	2.8E+3		9.3E+7	

### *Daily Geomagnetic Data*

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
	19 July	8	1-3-1-2-1-2-2-3	16	2-1-4-5-3-3-1-2	9
20 July	6	1-1-2-2-2-1-2-2	8	3-2-2-1-2-3-1-2	9	1-2-3-2-2-3-3-3
21 July	5	3-2-1-0-1-1-0-2	4	2-2-3-0-0-0-0-0	6	2-1-2-1-1-3-2-2
22 July	13	1-0-0-2-3-2-4-5	22	1-0-0-3-4-4-4-6	19	2-0-0-3-3-3-5-6
23 July	21	4-4-4-4-3-4-2-2	79	4-5-8-6-6-7-3-1	47	5-6-6-6-5-5-3-2
24 July	29	3-3-5-3-5-4-3-5	34	4-3-3-4-6-5-5-3	27	3-4-5-3-5-4-4-5
25 July	64	6-6-5-5-5-6-5-6	138	6-8-7-7-8-7-6-5	122	6-7-7-8-6-7-6-7



### *Alerts and Warnings Issued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
19 Jul 0007	7 – 245 MHz Radio Bursts	18 Jul
19 Jul 0007	245 MHz Noise Storm	18 Jul
19 Jul 0440	ALERT: Geomagnetic K= 4	19 Jul 0435
19 Jul 1638	ALERT: Geomagnetic K= 4	19 Jul 1646
20 Jul 0006	11 – 245 MHz Radio Bursts	19 Jul
20 Jul 0006	245 MHz Noise Storm	19 Jul
20 Jul 1229	ALERT: X-Ray Flux $\geq$ M5	20 Jul 1229
20 Jul 1251	SUMMARY: X-ray Event $\geq$ M5	20 Jul 1232
20 Jul 1329	SUMMARY: 10cm Radio Burst	20 Jul 1226
20 Jul 1347	ALERT: Type II Radio Emission	20 Jul 1235
20 Jul 1518	ALERT: Type IV Radio Emission	20 Jul 1232
20 Jul 2155	WATCH: Geomagnetic A $\geq$ 20	23 Jul
21 Jul 0549	SUMMARY: 10cm Radio Burst	21 Jul 0506
21 Jul 0704	ALERT: Type IV Radio Emission	21 Jul 0541
22 Jul 0008	18 – 245 MHz Radio Bursts	21 Jul
22 Jul 0008	245 MHz Noise Storm	21 Jul
22 Jul 0029	ALERT: X-Ray Flux $\geq$ M5	22 Jul 0027
22 Jul 0049	SUMMARY: X-ray Event $\geq$ M5	22 Jul 0032
22 Jul 0118	SUMMARY: 10cm Radio Burst	22 Jul 0021
22 Jul 0849	SUMMARY: 10cm Radio Burst	22 Jul 0743
22 Jul 1032	WARNING: Geomagnetic Sudden Impulse	22 Jul 1032 – 1130
22 Jul 1055	SUMMARY: Geomagnetic Sudden Impulse	22 Jul 1038
22 Jul 1141	SUMMARY: 10cm Radio Burst	22 Jul 1104
22 Jul 1528	WARNING: Geomagnetic K= 4	22 Jul 1530 – 2359
22 Jul 2009	WARNING: Geomagnetic K= 5	22 Jul 2015 – 2359
22 Jul 2055	ALERT: Geomagnetic K= 4	22 Jul 2054
22 Jul 2236	ALERT: Geomagnetic K= 5	22 Jul 2231
23 Jul 0002	WARNING: Geomagnetic K= 6	23 Jul 0030 – 0600
23 Jul 0646	WARNING: Geomagnetic K= 5	23 Jul 0646 – 1500
23 Jul 0649	ALERT: Geomagnetic K= 4	23 Jul 0648
23 Jul 0746	ALERT: Geomagnetic K= 5	23 Jul 0746
23 Jul 0847	ALERT: Geomagnetic K= 6	23 Jul 0847
23 Jul 0913	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	23 Jul 0850
23 Jul 1448	EXTENDED WARNING: Geomagnetic K= 4	22 Jul 1530 – 23/2359
23 Jul 1623	WARNING: Geomagnetic K= 5	23 Jul 1625 – 1800
23 Jul 1628	ALERT: Geomagnetic K= 5	23 Jul 1624
23 Jul 1732	ALERT: Type II Radio Emission	23 Jul 1600
23 Jul 1806	SUMMARY: 10cm Radio Burst	23 Jul 1719
23 Jul 2131	WATCH: Geomagnetic A $\geq$ 20	24 Jul
23 Jul 2133	WATCH: Geomagnetic A $\geq$ 20	26 Jul
23 Jul 2354	EXTENDED WARNING: Geomagnetic K= 4	22 Jul 1530 – 24/1500
24 Jul 0025	8 – 245 MHz Radio Bursts	23 Jul
24 Jul 0025	2 – 245 MHz Noise Storms	23 Jul
24 Jul 0501	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	24 Jul 0500
24 Jul 0623	WARNING: Geomagnetic K= 5	24 Jul 0630 – 1500
24 Jul 0734	ALERT: Geomagnetic K= 5	24 Jul 0734
24 Jul 1156	SUMMARY: 10cm Radio Burst	24 Jul 0603
24 Jul 1352	SUMMARY: 10cm Radio Burst	24 Jul 1334
24 Jul 1444	EXTENDED WARNING: Geomagnetic K= 5	24 Jul 0630 – 1800
24 Jul 1756	EXTENDED WARNING: Geomagnetic K= 5	24 Jul 0630 – 2359
24 Jul 2354	EXTENDED WARNING: Geomagnetic K= 5	24 Jul 0630 – 25/1500

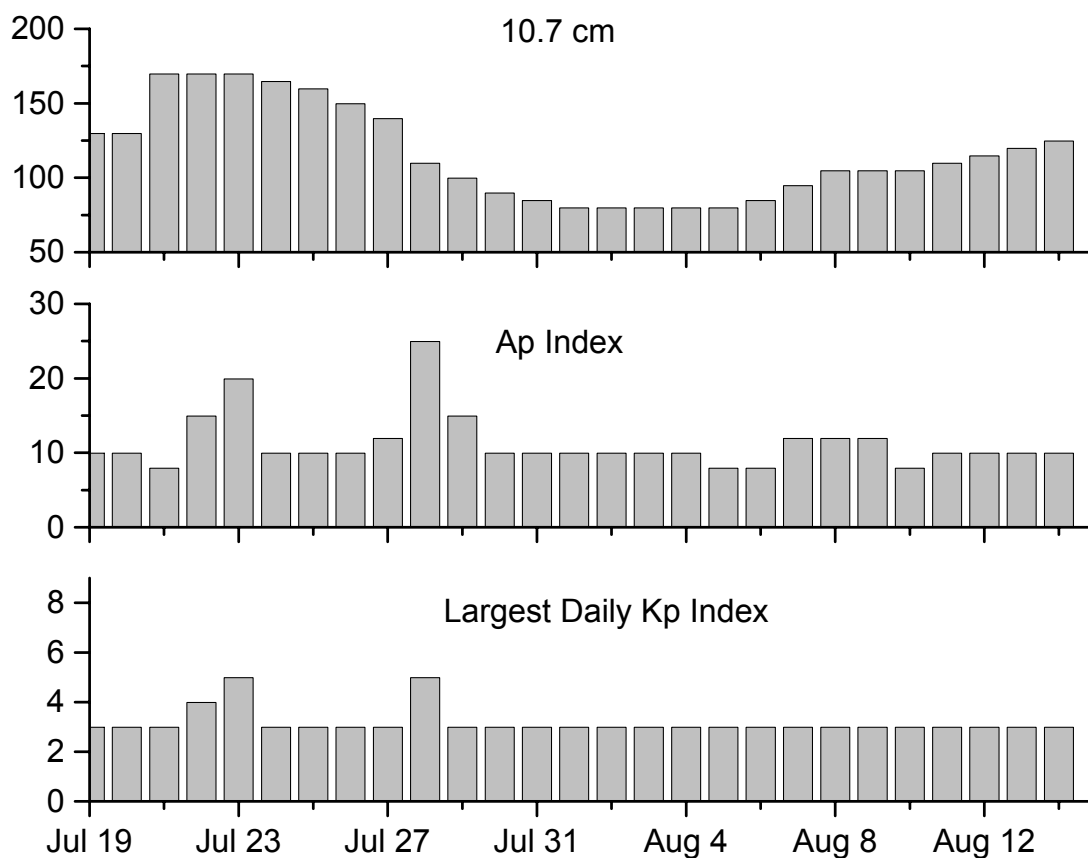


*Alerts and Warnings Issued - continued*

<u>Date &amp; Time of Issue</u>	<u>Type of Alert or Warning</u>	<u>Date &amp; Time of Event UT</u>
25 Jul 0024	245 MHz Radio Burst	24 Jul
25 Jul 0024	245 MHz Noise Storm	24 Jul
25 Jul 0337	ALERT: Geomagnetic K= 6	25 Jul 0335
25 Jul 0550	ALERT: X-Ray Flux $\geq$ M5	25 Jul 0549
25 Jul 0610	SUMMARY: X-ray Event $\geq$ M5	25 Jul 0551
25 Jul 0632	SUMMARY: 10cm Radio Burst	25 Jul 0543
25 Jul 0738	ALERT: Geomagnetic K= 6	25 Jul 0737
25 Jul 0750	WARNING: Geomagnetic K= 6	25 Jul 0745 – 1500
25 Jul 0755	ALERT: Type IV Radio Emission	25 Jul 0615
25 Jul 0924	ALERT: Electron 2MeV Integral Flux $\geq$ 1000pfu	25 Jul 0900
25 Jul 1028	ALERT: Geomagnetic K= 6	25 Jul 1028
25 Jul 1117	ALERT: Geomagnetic K= 7	25 Jul 1117
25 Jul 1302	ALERT: Geomagnetic K= 6	25 Jul 1302
25 Jul 1458	EXTENDED WARNING: Geomagnetic K= 6	25 Jul 0745 – 2359
25 Jul 1513	ALERT: Type IV Radio Emission	25 Jul 1415
25 Jul 1617	ALERT: Geomagnetic K= 6	25 Jul 1616
25 Jul 1639	WARNING: Geomagnetic K $\geq$ 7	25 Jul 1640 – 2359
25 Jul 1647	ALERT: Geomagnetic K= 7	25 Jul 1647
25 Jul 1712	ALERT: Type II Radio Emission	25 Jul 1521
25 Jul 1759	WARNING: Proton 10MeV Integral Flux $\geq$ 10pfu	25 1830 – 2359
25 Jul 1843	ALERT: Geomagnetic K= 6	25 Jul 1841
25 Jul 1910	ALERT: Proton 10MeV Integral Flux $\geq$ 10pfu	25 Jul 1855
25 Jul 2014	WATCH: Geomagnetic A $\geq$ 30	28 Jul
25 Jul 2016	WATCH: Geomagnetic A $\geq$ 50	26 Jul
25 Jul 2018	WATCH: Geomagnetic A $\geq$ 50	27 Jul
25 Jul 2205	ALERT: Geomagnetic K= 6	25 Jul 2203
25 Jul 2319	EXTENDED WARNING: Proton 10MeV Integral Flux $\geq$ 10pfu	25 Jul 1830 – 26/1500
25 Jul 2347	EXTENDED WARNING: Geomagnetic K= 6	25 Jul 0745 – 26/1500



## Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
28 Jul	110	25	5	11 Aug	110	10	3
29	100	15	4	12	115	10	3
30	90	10	3	13	120	10	3
31	85	10	3	14	125	10	3
01 Aug	80	10	3	15	125	10	3
02	80	10	3	16	125	8	3
03	80	10	3	17	125	8	3
04	80	10	3	18	125	10	3
05	80	8	3	19	120	10	3
06	85	8	3	20	115	10	3
07	95	12	3	21	105	10	3
08	105	12	3	22	100	10	3
09	105	12	3	23	95	10	3
10	105	8	3				



### *Energetic Events*

Date	Time			X-ray		Optical Information			Peak		Sweep Freq	
	Begin	Max	½	Class	Flux	Imp/ Brtns	Location		Radio Flux		Intensity	
			Max				Rgn	Lat	CMD	245	2695	II
20 Jul 04	1222	1232	1245	M8.6	.073	3b	N11E34	652	1000	3000	2	2
22 Jul 04	0014	0032	0043	M9.1	.079	Sb	N06E25	652	2600			
22 Jul 04	2240	2258	2307	M1.6	.016	2n	N05E04	652	550	68		
22 Jul 04	2310	2324	2343	M1.2	.023							
23 Jul 04	1707	1728	1735	M2.2	.015	Sf	N03W04	652	3700			
23 Jul 04	2115	2123	2130	M1.7	.009		N05W07	652	300	110		
24 Jul 04	0601	0606	0610	M1.0	.003	1f	N07W20	652	140	230		
24 Jul 04	1840	1850	1856	M2.5	.014		N05W19	652	81	100		
25 Jul 04	0539	0551	0558	M7.1	.038	2b	N10W31	652	81	810		1
25 Jul 04	0630	0639	0645	M1.0	.007	1f	N03W27	652		34		
25 Jul 04	1337	1349	1355	M2.2	.013		N04W30	652	620	65		
25 Jul 04	1419	1514	1643	M1.1	.065	1f	N08W33	652	2100	120	1	2

### *Flare List*

Date	Time			X-ray Class.	Optical Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
19 July	0038	0045	0049	C2.3	Sf	S09W02	649
	B0202	0208	0213	C2.1	1f	N08E48	652
	0527	0530	0543	C4.6	Sf	S12W02	649
	0650	0653	0659	C3.4	Sf	N09E47	652
	1006	1006	1011	C2.5	Sf	S10W05	649
	1050	1053	1058	C2.9	1f	N09E44	652
	1300	1314	1322	C2.5		S10W07	649
	1419	1419	1424		Sf	S09W05	649
	1511	1512	1522	C2.5	Sf	S09W05	649
	1731	1733	1744	C1.8	Sf	S13E51	653
	2054	2059	2103	C1.8			652
	2138	2138	2141	C1.7	Sf	N04E42	652
	2143	2144	2149		Sf	N08E38	652
	20 July	B0100	0101	0109	C3.3	1f	S07W13
0411		0423	0430	C2.3		N04E39	652
0453		0457	0500	C1.4		N04E38	652
0618		0622	0624	C1.6			
0631		0648	0702	C2.3			
1106		1108	1142	C6.0	Sf	N05E35	652
1226		1232	1303	M8.6	3b	N11E34	652
1817		1823	1842	C3.8	Sf	N03E32	652
21 July	2112	2118	2150	C8.1	Sf	N04E28	652
	B0033	0034	0042	C6.6	1f	S11W27	649
	0407	0412	0414	B9.9		S11W30	649
	0453	0458	0503	C1.3		N08E19	652
	0514	0516	0538	C8.9	1f	N05E24	652
	B0514	0517	0541		1n	N03E23	



*Flare List-continued*

Date	Time			X-ray Class.	Optical		Rgn	
	Begin	Max	End		Imp / Brtns	Location Lat CMD		
21 July	1756	1759	1809		Sf	N07E21	652	
22 July	0014	0032	0043	M9.1	Sb	N06E25	652	
	0633	0638	0644	C1.6		N05E14	652	
	0654	0700	0707	C2.0		N05E14	652	
	0741	0759	0808	C5.3		N04E10	652	
	0907	0912	0919	C1.8		N04E10	652	
	1107	1107	1129	C5.8	Sf	N04E11	652	
	1537	1543	1549	C2.3		N05E09	652	
	1718	1721	1749	C3.2	Sf	N04E07	652	
	1756	1800	A1836		Sf	N04E07	652	
	2201	2212	2218	C4.1		N03E05	652	
	2233	2256	A2333	M1.6	2n	N05E04	652	
	2310	2324	2343	M1.2				
	23 July	0303	0336	0413	C4.7			652
		0641	0649	0706	C2.1			652
0644		0645	0652		Sf	N03W04	652	
0722		0723	0739	C4.1	Sf	N03W04	652	
1603		1609	1615	C1.0			652	
B1723		U1725	A1735	M2.2	Sf	N03W04	652	
1802		1807	1811	C4.1			652	
2115		2123	2130	M1.7			652	
24 July	0034	0039	0041	C1.6				
	0110	0114	0116	C1.1		S11W71	649	
	0410	0413	0416	C1.2				
	0604	0605	0616	M1.0	1f	N07W20	652	
	0810	0815	0824	C2.5	Sf	N03W14	652	
	0937	0941	0949	C1.1				
	1024	1025	1037	C3.5	Sf	N08W15	652	
	1335	1335	1347	C4.8	Sf	N04W16	652	
	1446	1455	1501	B9.7		N05W17	652	
	1651	1654	1656	B8.6			650	
	1732	1738	1742	C1.0				
	1827	1827	1836	C1.1	Sf	N08W22	652	
	1840	1850	1856	M2.5		N05W19	652	
	2134	2138	2140	C1.2		N13W15	652	
	2159	2207	2215	C1.4			652	
	2311	2322	2332	C2.7		N03W26	652	
	25 July	0030	0031	0036	C7.4	Sf	N09W26	652
0543		0548	0623	M7.1	2b	N10W31	652	
0632		0636	0701	M1.0	1f	N03W27	652	
0708		0714	0725	C6.9	Sf	N09W34	652	
1318		1325	1332	C2.1		N04W29	652	





**Flare List-continued**

Date	Time			X-ray Class.	Optical		Rgn
	Begin	Max	End		Imp / Brtns	Location Lat CMD	
25 Jul	1337	1349	1355	M2.2		N04W30	652
	1433	1448	1643	M1.1	1f	N08W33	652
	1625	1627	1634		Sf	N08E54	

**Region Summary**

Date	Location		Sunspot Characteristics				Flares				
	Helio		Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical
	(° Lat ° CMD)	Lon						C	M	X	S

*Region 644*

10 Jul	N11E69	080	0100	03	Hsx	001	A										
11 Jul	N12E58	078	0140	03	Hax	001	A										
12 Jul	N11E44	079	0110	04	Dso	007	B										
13 Jul	N11E30	080	0120	05	Dao	010	B										
14 Jul	N11E17	080	0130	04	Dso	009	B										
15 Jul	N12E04	079	0120	05	Cso	004	B										
16 Jul	N13W07	077	0160	04	Hsx	005	A										
17 Jul	N13W20	077	0150	05	Dso	008	B										
18 Jul	N13W33	077	0110	04	Cso	006	B										
19 Jul	N13W46	077	0150	04	Cso	005	B										
20 Jul	N13W61	078	0100	02	Hrx	001	A										
21 Jul	N12W73	077	0090	04	Hsx	002	A										
22 Jul	N11W88	079	0060	02	Hsx	001	A										

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude:079

*Region 647*

11 Jul	S14E61	075	0010	01	Axx	001	A										
12 Jul	S14E48	075															
13 Jul	S14E35	075															
14 Jul	S14E22	075															
15 Jul	S14E09	075															
16 Jul	S14W04	075															
17 Jul	S14W17	075															
18 Jul	S14W30	075															
19 Jul	S14W43	075															
20 Jul	S14W56	075															
21 Jul	S14W69	075															
22 Jul	S14W82	075															
23 Jul	S14W95	075															

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude:075



**Region Summary - continued.**

Date	Location		Sunspot Characteristics				Flares											
	( ° Lat ° CMD)	Helio	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 649</i>																		
12 Jul	S10E76	047	0090	10	Cao	004	B	5										
13 Jul	S10E64	046	0410	16	Fai	026	B	6	2			1	1					
14 Jul	S10E53	044	0360	15	Eai	034	Bgd	4	1			2						
15 Jul	S10E40	043	0360	15	Eac	038	Bgd	2			2							
16 Jul	S10E26	044	0530	16	Fki	048	Bgd	1	1	3	2	2						1
17 Jul	S10E13	044	0500	16	Fkc	047	Bgd	9	3	1	6	3						
18 Jul	S10E00	044	0510	16	Fac	043	Bgd	11	3		8	2						
19 Jul	S10W13	044	0370	15	Eac	050	Bgd	5			5							
20 Jul	S10W27	044	0230	12	Eac	033	Bgd	1			1	1						
21 Jul	S10W41	045	0200	11	Dao	026	Bg	1				1						
22 Jul	S11W56	047	0150	10	Dao	010	Bg											
23 Jul	S11W74	052	0120	04	Hax	002	B											
24 Jul	S11W87	052	0060	03	Hsx	002	A	1										
								46	10	6	25	1	0	1	0			

Crossed West Limb.

Absolute heliographic longitude: 044

<i>Region 650</i>																		
14 Jul	S08E31	066	0010	01	Hsx	001	A											
15 Jul	S08E18	065	0010	02	Axx	002	A											
16 Jul	S08E08	062	0010	04	Bxo	010	B											
17 Jul	S08W05	062																
18 Jul	S12W15	059	0010	04	Bxo	002	B											
19 Jul	S12W28	059																
20 Jul	S12W41	059																
21 Jul	S12W54	059																
22 Jul	S12W67	059																
23 Jul	S12W80	059																
24 Jul	S12W93	059																
								0	0	0	0	0	0	0	0	0	0	

Crossed West Limb.

Absolute heliographic longitude: 062



**Region Summary - continued.**

Date	Location		Sunspot Characteristics				Flares											
	( ° Lat ° CMD)	Helio	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical							
		Lon						C	M	X	S	1	2	3	4			
<i>Region 651</i>																		
14 Jul	S16E44	053	0010	06	Bxo	004	B											
15 Jul	S16E29	054	0010	09	Bxo	012	B	1										
16 Jul	S16E14	056	0010	09	Bxo	011	B											
17 Jul	S16E01	056	0010	06	Bxo	005	B											
18 Jul	S16W10	054	0010	04	Bxo	005	B											
19 Jul	S16W23	054	0010	04	Bxo	006	B											
20 Jul	S16W37	054	0000	04	Bxo	003	B											
21 Jul	S16W48	052	0010	02	Bxo	002	B											
22 Jul	S16W61	052																
23 Jul	S16W74	052																
24 Jul	S16W87	052																
									1	0	0	0	0	0	0	0	0	0

Crossed West Limb.

Absolute heliographic longitude:056

<i>Region 652</i>																		
16 Jul	N05E84	346	0300	07	Hhx	002	A					1						
17 Jul	N05E71	346	0750	11	Ekc	028	B	2				2						
18 Jul	N05E58	346	1370	17	Fkc	030	Bgd	2				3						
19 Jul	N05E45	346	1525	18	Fkc	052	Bgd	4				3	2					
20 Jul	N10E32	345	1670	17	Fkc	043	Bgd	5	1			3						1
21 Jul	N08E19	345	2010	17	Fkc	067	Bgd	2				1	1					
22 Jul	N08E06	345	1730	18	Fkc	056	Bgd	8	2			4						1
23 Jul	N08W10	348	1840	19	Fkc	049	Bgd	5	2			3						
24 Jul	N08W21	346	1610	19	Fkc	073	Bgd	7	2			4	1					
25 Jul	N08W35	347	1340	18	Fkc	089	Bgd	3	4			2	2	1				
								38	11	0	25	5	2	1	0			

Still on Disk.

Absolute heliographic longitude:345



### *Region Summary - continued.*

Date	Location		Sunspot Characteristics				Flares								
	(° Lat ° CMD)	Helio Lon	Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
							C	M	X	S	1	2	3	4	
<i>Region 653</i>															
17 Jul	S14E71	346	0100	08	Dao	010	B								
18 Jul	S14E58	346	0200	11	Cao	011	B								
19 Jul	S14E45	346	0270	12	Dai	013	B	1			1				
20 Jul	S14E32	346	0190	07	Cao	017	B								
21 Jul	S12E20	344	0110	06	Cai	015	B								
22 Jul	S12E05	346	0130	08	Dai	010	B								
23 Jul	S13W09	347	0090	04	Dso	005	B								
24 Jul	S12W24	349	0060	04	Cso	004	B								
25 Jul	S12W37	349	0070	05	Cso	004	B								
								1	0	0	1	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 346															
<i>Region 654</i>															
25 Jul	N08E52	260	0030	05	Cao	007	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 260															

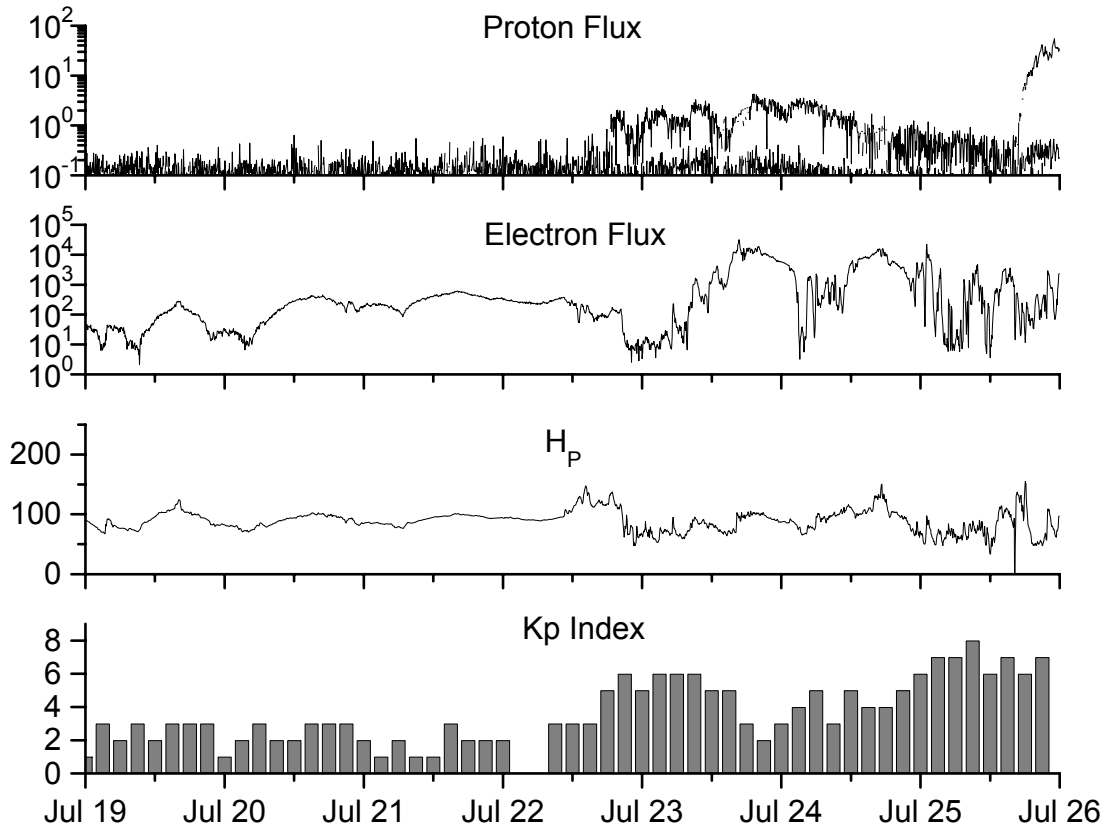


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers			Radio Flux		Geomagnetic			
	Observed values SWO	Ratio RI	Ratio RI/SWO	Smooth values SWO	Smooth values RI	*Penticton 10.7 cm	Smooth Value	Planetary Ap	Smooth Value
<b>2002</b>									
July	183.5	99.6	0.54	175.4	102.7	173.5	176.3	11	13.7
August	191.0	116.4	0.61	169.2	98.7	183.9	169.5	16	14.2
September	206.4	109.6	0.53	163.4	94.6	175.8	164.1	14	15.0
October	153.9	97.5	0.63	158.8	90.5	167.0	159.4	23	15.6
November	159.8	95.5	0.60	150.9	85.2	168.7	154.8	16	16.3
December	147.9	80.8	0.55	144.6	82.1	158.6	150.9	13	17.0
<b>2003</b>									
January	149.3	79.7	0.53	141.7	81.0	144.0	149.2	13	18.2
February	87.0	46.0	0.53	136.4	78.5	124.5	144.7	17	18.9
March	119.7	61.1	0.51	128.1	74.2	132.2	139.5	21	19.4
April	119.7	60.0	0.50	121.5	70.3	126.3	136.3	20	20.0
May	89.6	55.2	0.62	118.3	67.8	129.3	135.0	26	21.0
June	118.4	77.4	0.65	113.6	65.2	129.4	132.6	24	21.8
July	132.8	85.0	0.64	106.9	62.0	127.8	129.5	20	22.3
August	114.3	72.7	0.64	102.8	60.3	122.1	127.5	23	22.4
September	82.6	48.8	0.59	100.7	59.8	112.3	126.0	19	21.9
October	118.9	65.6	0.55	96.6	58.4	153.1	124.1	32	21.1
November	118.9	67.2	0.57	93.6	57.0	153.1	121.8	31	20.0
December	75.4	47.0	0.62			115.1		18	
<b>2004</b>									
January	62.3	37.2	0.60			114.1		20	
February	75.6	46.0	0.61			107.0		13	
March	81.0	48.9	0.60			112.2		12	
April	59.3	39.3	0.66			101.3		10	
May	77.3	41.5	0.54			99.7		9	
June	78.9	43.2	0.55			99.7		9	

**NOTE:** All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI= 120.8, occurred April 2000. \*After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.





*Weekly Geosynchronous Satellite Environment Summary  
Week Beginning 19 July 2004*

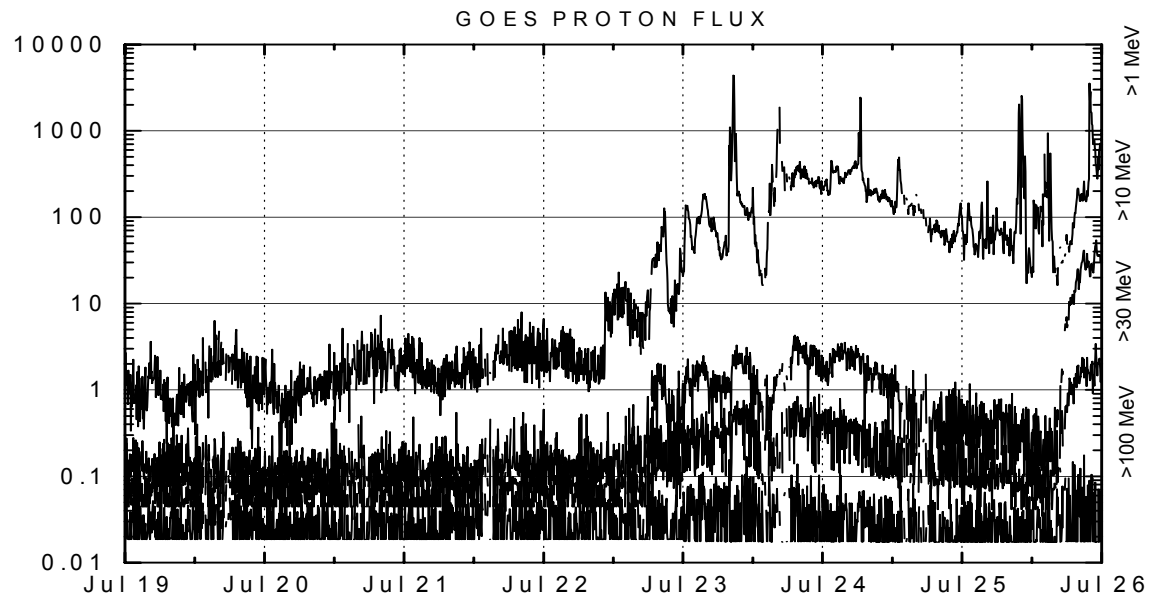
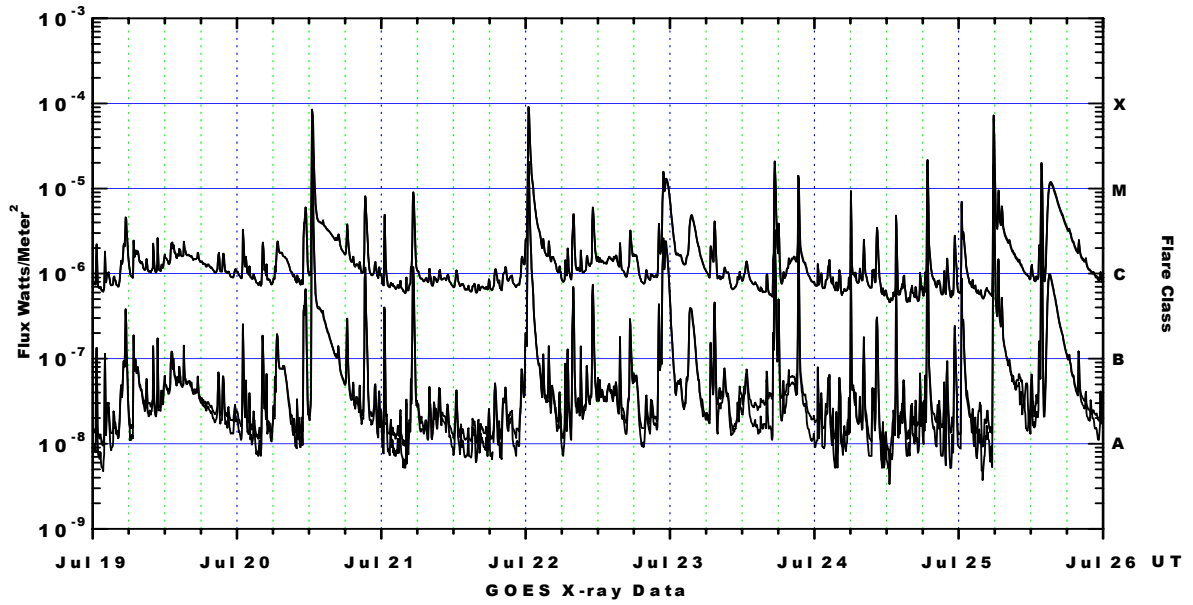
*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec -sr) as measured by GOES-11 (W98) for each of three energy thresholds: greater than 10, 50, and 100 MeV. *Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec -sr) with energies greater than 2 MeV at GOES-12 (W75).

*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<sub>p</sub>* plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Heartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC) and the US Geological Survey. These may differ from the final K<sub>p</sub> values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SWO and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and K<sub>p</sub> are "global" parameters that are applicable to a first order approximation over large areas. H<sub>p</sub> is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





*Weekly GOES Satellite X-ray and Proton Plots*

X-ray plot contains five-minute averaged x-ray flux (watts/m<sup>2</sup>) as measured by GOES 12 (W75) and GOES 10 (W135) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W98) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm<sup>2</sup>-sec-sr) at greater than 10 MeV.

